SONY

UHF SYNTHESIZED TRANSMITTER

WRT-822A

SERVICE MANUAL

U Model
AU Model

1st Edition

⚠警告

このマニュアルは，サービス専用です。
お客様が，このマニュアルに記載された設置や保守，点検，修理などを行うと感電や火災，人身事故につながることがあります。
危険をさけるため，サービストレーニングを受けた技術者のみご使用ください。

⚠WARNING

This manual is intended for qualified service personnel only.
To reduce the risk of electric shock, fire or injury, do not perform any servicing other than that contained in the operating instructions unless you are qualified to do so. Refer all servicing to qualified service personnel.

⚠WARNUNG

Die Anleitung ist nur für qualifiziertes Fachpersonal bestimmt.
Alle Wartungsarbeiten dürfen nur von qualifiziertem Fachpersonal ausgeführt werden. Um die Gefahr eines elektrischen Schlages, Feuergefahr und Verletzungen zu vermeiden, sind bei Wartungsarbeiten strikt die Angaben in der Anleitung zu befolgen. Andere als die angegeben Wartungsarbeiten dürfen nur von Personen ausgeführt werden, die eine spezielle Befähigung dazu besitzen.

⚠AVERTISSEMENT

Ce manual est destiné uniquement aux personnes compétentes en charge de l'entretien. Afin de réduire les risques de décharge électrique, d'incendie ou de blessure n'effectuer que les réparations indiquées dans le mode d'emploi à moins d'être qualifié pour en effectuer d'autres. Pour toute réparation faire appel à une personne compétente uniquement.

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SONY

3-866-667-11 (1)

UHF Synthesized Transmitter

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WRT-822A

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U64 U66 U68

Owner's Record

The model and serial numbers are located at the rear of the unit. Record the serial number in the space provided below. Refer to these numbers whenever you call upon your Sony dealer regarding this product.

Model No. WRT-822A Serial No. _____

Notice for customers in the U.S.A.
Use of Sony wireless devices is regulated by the Federal Communications Commission as described in Part 74 subpart H of the FCC regulations and users authorized thereby are required to obtain an appropriate licence.

You are cautioned that any changes or modifications not expressly approved in this manual could void your authority to operate this equipment.

Notice for customers in Canada:

Use of Sony wireless devices is regulated by the Industry Canada as described in their Radio Standard Specification RSS-123. A licence is normally required. The local district office of Industry Canada should therefore be contacted. When the operation of the device is within the broadcast band, the licence is issued on no-interference, no-protection basis with respect to broadcast signals.

Operation of this device is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Avis pour les clients au Canada:

L'usage des appareils sans-fil Sony est réglé par l'Industrie Canada comme décrit dans leur Cahier des Normes Radioélectriques CNR-123. Une licence est normalement requise. Le bureau de l'Industrie Canada doit être contracté. Lorsque l'opération de l'appareil est dans les limites de la bande de radiodiffusion, la licence est émanée sur la base de non-interférence, non-protection avec les signaux de radiodiffusion.

L'utilisation de cet appareil est soumise aux deux conditions suivantes : (1) cet appareil ne peut causer d'interférences, et (2) cet appareil doit accepter toutes les interférences, y compris les interférences capables de provoquer un fonctionnement indésirable de l'appareil.

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Precautions

- The unit is designed for use in ambient temperature range of 0°C to 50°C (32°F to 122°F).
- Do not place the unit on or near heat sources, such as lighting equipment, power amplifiers, or in a place subject to direct sunlight or excessive moisture. In such places, the external finish or internal parts of the unit may be damaged.
- If the unit is used in a very humid or dusty place or in a place subject to an active gas, clean its surface as well as the connectors with a dry, soft cloth soon after use. Lengthy use of the unit in such places or not cleaning it after its use in such places may shorten its life.
- When cleaning the unit, never use organic solvents such as thinners or benzine, which will damage the finish of the unit.
- The unit has been factory adjusted precisely. Do not tamper with its internal parts or attempt to repair it.

Section 1
Operating Instructions

This section is extracted from operation manual.

Overview

The WRT-822A ensures excellent sound quality of the microphone itself and provides the convenience especially for Electronic News Gathering (ENG), live and other Electronic Field Production (EFP) applications. Combining with 800 MHz band Sony UHF wireless microphone system, use this highly reliable transmitter for broadcast and movie production purpose.

Transmitting Channel Band

The transmitter and tuner of the wireless microphone system are classified by frequency band.
A 12-MHz frequency band (or two consecutive-numbered TV channels, such as 68 and 69 of the WRT-822A/68 model) is assigned to each transmitter and tuner model.

In building a UHF wireless microphone system, be sure to combine a transmitter and a tuner having the same TV channel number.

U68 model
A 794-806 MHz frequency band is assigned to the WRT-822A/68 model, permitting it to operate on any of 94 carrier frequencies in 125-kHz steps of Sony original channel plan in the range of TV channels 68 and 69.

For the selectable channels, see wireless channel list on page L-1.

U66 model
A 782-794MHz frequency band is assigned to the WRT-822A/66 model, permitting it to operate on any of 94 carrier frequencies in 125-kHz steps of Sony original channel plan in the range of TV channels 66 and 67.

For the selectable channels, see wireless channel list on page L-2.

U64 model
A 770-782 MHz frequency band is assigned to the WRT-822A/64 model, permitting it to operate on any of 94 carrier frequencies in 125-kHz steps of Sony original channel plan in the range of TV channels 64 and 65.

For the selectable channels, see wireless channel list on page L-3.

Features

Phase Locked Loop (PLL) synthesized system
The WRT-822A has a refined phase locked loop (PLL) synthesizer circuit.

Compact and lightweight
Innovative high-density mounting technology and magnesium case have enabled the creation of this compact and lightweight transmitter, which lets you move anywhere for Electronic News Gathering (ENG) and Electronic Field Production (EFP).

Remote battery alarm on tuner
This transmitter has capability of transmitting "Battery status information" to Sony tuners which support the battery status indication on both transmitter and tuner.
The information is sent to the tuners in approx. one hour advance to battery exhaust so that they can safely replace batteries of the transmitter.

Operation powered by easily available batteries
The built-in high efficiency DC-DC converter allows stable operation, for about 8 hours continuously, with two LR6 (size AA) alkaline batteries.

LCD for coordinated operation control
The built-in CPU controls operation of the unit, including the PLL circuit function. The LCD shows the current channel number/frequency, the residual battery power, input attenuation setting, AF input level and RF output.
An accumulated operation time indication is also provided for simple control of the time of battery use (in one-minute increments).

Saved channel and input attenuation settings
The unit stores the channel and the input attenuation setting when it is turned off. The saved settings are retained even if the batteries are removed. Therefore, when using the unit next time, you need not make the same settings again.

Highly reliable electronic attenuator
The built-in input level attenuator is adjustable in a range of 0 to 21 dB in 3-dB steps. It reduces signal distortion when an excessively strong audio signal is inputted.

Compatibility with Sony lavalier microphone
The transmitter is compatible with Sony lavalier microphones, including the ECM-77BC.

RF carrier with tone signal
The unit transmits the RF carrier accompanied by a tone signal, enabling the tuner with a tone squelch circuit to take out only the target audio signal received.

Wide dynamic range and low noise
The compander (compressor/expander) system enables transmission over a wide dynamic range with minimum noise

System Configuration

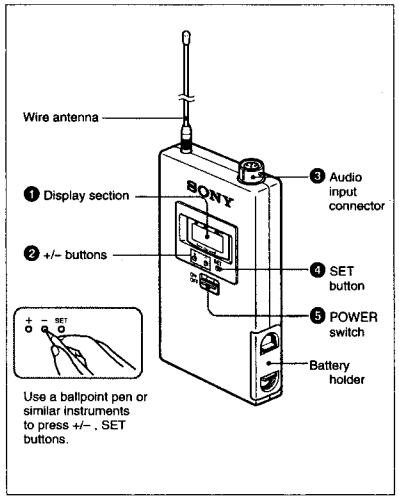
The WRT-822A can be used with the tuners listed below.

Sony 800 MHz band system models

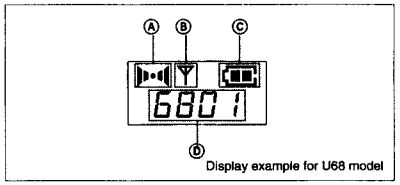
WRT-822A	Frequency band		Model name	
	TV channel	Frequency (MHz)	Transmitter or microphone	Tuner
U64	64	770.125 - 775.875	WRT-805A WRT-807A WRT-808A WRT-810A WRT-820A **WRT-822A** WRT-830A[a] WRT-860A WRT-867A[a]	WRR-800A WRR-801A WRR-802A WRR-805A WRR-810A WRR-820A[b] WRR-840A[b] WRR-850A[b] WRR-855A WRR-860A[a] MB-806A
	65	776.125 - 781.875		
U66	66	782.125 - 787.875		
	67	788.125 - 793.875		
U68	68	794.125 - 799.875		
	69	800.125 - 805.875		

a) These models cover only 68 and 69 channels.
b) For these models, the AN-820A UHF antenna and the WD-820A UHF antenna divider are required.

Parts Identification



1 Display section



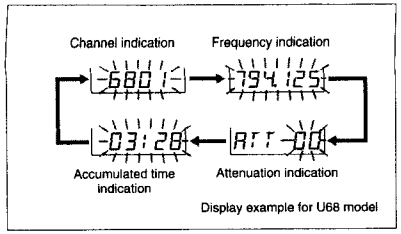
A AF (audio input) indication
Lights when an audio signal over the reference level is being supplied.

B RF (antenna output) indication
Lights when a signal is being transmitted from the antenna.

C BATT (battery) indication
Displays the status of the batteries.
See "Battery indication" on page 9.

D CH (channel) indication
Displays the transmission channel.
Each time you press the SET button in normal Transmit mode, the channel indication changes to the frequency, input attenuation and accumulated time indications as shown on the next page.

Parts Identification



In Attenuation indication mode, it displays the input attenuation setting in dB, which can be changed in a range of 0 to 21 dB in 3-dB steps.
In Accumulated time indication mode, it displays the accumulated time of battery use (in one-minute increments).
For adjustments, see "Changing the Transmitting Channel" on page 11, "Changing the Input Attenuation Setting" on page 12 or "Resetting the Accumulated Time Indication" on page 13.

❷ + (+ selection) / – (– selection/reset) buttons
In setting mode, select the transmission channel, frequency and attenuator level using either of these buttons, or reset the time-of-use indication to "00:00" with the – button.
For Setting mode, see "Settings" on page 11.

❸ Audio input connector
Connect the output connector of the following Sony lavalier microphones: ECM-44BC, ECM-55BC, ECM-66BC, ECM-77BC, ECM-166BC, ECM-310BC, ECM-350BC.
You can also use your wired microphone by connecting it to this connector with an optional EC-1.5CF microphone cable.
See "Connections" on page 10.

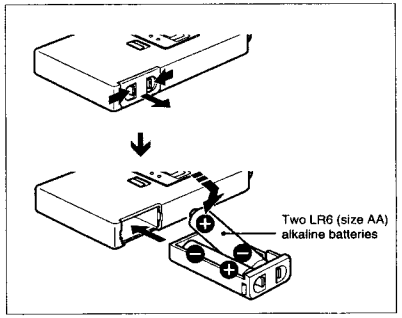
❹ SET button
In normal Transmit mode, this button changes the indication items of the display section as shown on the left column.
In Setting mode, this button selects the item to be set. To initiate the setting mode, set the POWER switch to ON while holding this button down.
For setting the transmit channel, input attenuation or resetting the time-of-use indication in Setting mode, see "Settings" on page 11.

❺ POWER switch
Turns the power of the transmitter ON or OFF.
When you set this switch to ON without holding any other button, the transmitter is set to normal Transmit mode and transmits the signal of the selected channel.
When you set this switch to ON while holding the SET button down, Setting mode is initiated. No signal is transmitted in Setting mode.

Note
Be sure to connect a microphone before turning the power ON.

Power Supply

The transmitter can operate on two LR6 (size AA) alkaline batteries continuously for about 8 hours at 25°C (77°F).



Installing the batteries

1 Slide the battery-holder catches inward (in the direction of the arrows ➡ ⬅) to take out the battery holder.

2 Match the polarities and insert the batteries.

3 Set the battery holder in the original position.

Battery indication

When you turn the power on, the battery status appears in the BATT indication on the display section.

	1	2	3	4
BATT indication	Lights	Lights	Flashes	Goes off
Battery condition	Good	Less than half-charge	Almost exhausted	Completely exhausted

When the batteries reach stage **3** shown in the table, the battery indication on the tuner also starts flashing.

Note
The indication may be incorrect if the batteries are not new when installed. If you plan to use the transmitter for a long period, it is best to replace the batteries with new ones.

Notes on batteries

- Use new alkaline batteries.
- Do not pair different types of batteries.
- Always replace the two batteries together.
- The batteries are not rechargeable.
- Be careful to install the batteries with the correct polarity.
- When not using the transmitter for a long period, remove the batteries to avoid leakage. If the batteries do leak, clean all leakage from the battery holder case and the unit. Leakage left in the holder case and the unit may cause poor battery contact. If there seems to be poor battery contact, consult your Sony dealer.

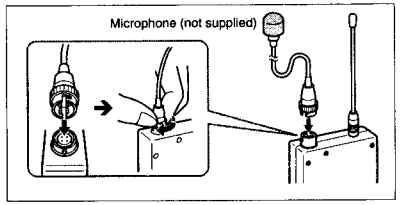
Connections

Caution
When connecting a microphone to the unit, be sure to turn the unit off.

To connect a microphone

The WRT-822A accepts the following Sony lavalier microphones:
ECM-44BC ECM-55BC ECM-66BC
ECM-77BC ECM-166BC
ECM-310BC ECM-350BC
You can also use your wired microphone by connecting it to this connector with an optional EC-1.5CF microphone cable.

To secure the microphone cable connection, be sure to turn and lock the connector cover as illustrated below.



For the input attenuation adjustment, see page 12.

Notes on Microphone System Operation

- To operate with two or more channels, maintain a distance of at least 30 cm (one ft.) between each pair of transmitters.
For details of operation with two or more channels, refer to the Operating Instructions for the tuner which is used with the WRT-822A.
- Ensure that the tuners set to channels not being used are either turned off or set to the minimum output level.
- When powering the transmitter on or off, to keep the noise to a minimum, set the audio output level from the tuner or mixer to a minimum.
- Powering the transmitter on without checking the channel selection first may interfere with the operation of other microphones/transmitters, if the current setting is already being used.
- To prevent noise generation, keep the transmitters at least 3 m (10 feet) away from the antennas when the system is operated using a group which allows selection of up to 11 channels, and at least 6 m (20 feet) away when using a group which allows selection of 12 channels.

Settings

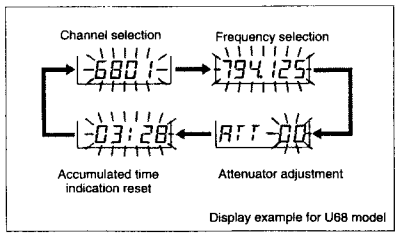
Initiating Setting Mode

In Setting mode, you can change the transmission channel/ frequency and the attenuation level, or reset the accumulated time indication.

To enter Setting mode
While holding down the SET button, set the POWER switch to ON.

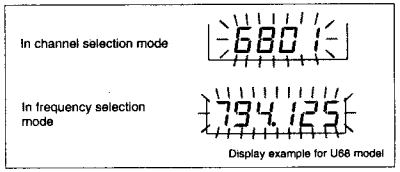
The transmitter enters Setting mode and the indication before the transmitter was previously turned OFF flashes on the display section.

Each time you press the SET button, the setting items are cyclically switched as shown below.

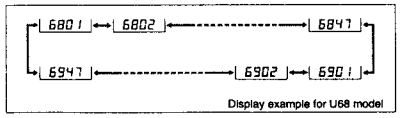


Changing the Transmitting Channel

1 Confirm that the channel number flashes on the display. If not, set the unit in Setting mode, and press the SET button so that the channel number flashes.
If you want to change the channel in frequency indication, press the SET button one more.



2 Press the + or – button to select the channel.
Pressing the + button cyclically changes the channel indication in the order shown on pages L-1 to L-3.
Pressing the – button changes it in reversed order.
If you keep either button pressed, the channel number will be incremented or decremented successively.



Settings

3 Once the desired channel number appears, set the POWER switch to OFF to release Setting mode.

Or, press the SET button to continue operations in Setting mode.

The next time you turn on the power only by setting the POWER switch to ON, the transmitter will be set to Transmit mode with the selected channel.

Notes

- The unit cannot transmit in Setting mode.
- Make sure that the channel selected is the same as that selected on the tuner used in the same system.
- Depending on the noise or interference conditions, the selectable channels may not necessarily all be usable. If necessary, you can determine the usable channels by stepping the channel selection through a number of channels on the tuner with the microphone/transmitter set to OFF. Those channels on which the RF indicator of the tuner does not light are usable.
- If there is a TV broadcasting station near by, do not use the station's channel.
- The unit may not operate correctly if it is turned on again immediately after turning off the power while in setting mode. Pause for a few seconds or more before turning on the power again.
- When operating two or more UHF wireless microphone systems using channels in different groups, ensure that the systems are at least 100 m (330 feet) apart from each other. (The same applies also when using channels in a group if the different UHF wireless microphone systems are installed where they are within sight of each other.)

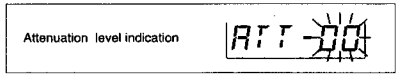
Changing the Input Attenuation Setting

You can change the input attenuation setting in 3-dB steps in a range of 0 to 21 dB. You can change it either in Setting mode or in Transmit mode.

Changing in Setting mode

1 Set the unit in Setting mode.

2 Press the SET button until the attenuation level indication appears on the display.



3 Press the + or – button to select the attenuation level.

If you keep either button pressed, the level will be incremented or decremented successively.

4 Once the desired level appears, set the POWER switch to OFF to release Setting mode.
Or, press the SET button to continue operations in Setting mode.

The next time you turn on the power only by setting the POWER switch to ON, the transmitter will be set to Transmit mode with the selected attenuation setting.

Changing in Transmit mode

You can also change the input attenuation level during transmission.

1 If the attenuation level is not displayed, press the SET button until the attenuation level indication appears on the display.

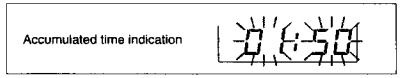
2 Press the + or – button to select the level.

Resetting the Accumulated Time Indication

The time indication accumulates time in hours and minutes when the WRT-822A is on.
Reset the indication to "00:00" whenever you replace the batteries so that it can display the running time of the batteries.

1 Set the unit in Setting mode.

2 Press the SET button until the accumulated time indication appears on the display.



3 Press the – button.
The time indication resets to "00:00."
While you see "00:00" indication, you can go back to previous value by pressing the + button.

4 Set the POWER switch to OFF to release Setting mode.

Error Messages

When a problem occurs, one of the following error messages may appear on the display.

Messages	Contents	Measures
Error 11	An error occurred in backup memory data.	The data was initialized. Set the transmitting channel and the input attenuation again.
Error 21	The PLL synthesized circuit is in trouble.	Contact your Sony dealer.
Error 31	The battery voltage exceeds the allowable value.	Use the specified batteries.
Error 41	Defect of an internal circuit	Contact your Sony dealer.
Error 51	Defect of the A/D converter	
Error 61	Defect of an internal circuit	

Specifications

Transmitter and modulator section

Oscillator	Crystal controlled PLL synthesizer
Type of emission	F3E
Carrier frequencies	
U64 model:	770.125 to 781.875 MHz
U66 model:	782.125 to 793.875 MHz
U68 model:	794.125 to 805.875 MHz
RF power output	10 mW
Frequency stability	Within ±0.005%
Tone signal	32.768 kHz
Type of antenna	1/4-wavelength wire
Pre-emphasis	50 µs
Deviation	±5 kHz (–60 dBV [1], 1 kHz input with 0 dB audio attenuation)
Frequency response	70 to 13,000 Hz
Signal-to-noise ratio	60 dB or more (A-weighted, with reference deviation at WRR-800A/801A/805A/ 810A/820A/840A/850A/855A/860A)
Audio attenuator	0 to 21 dB, variable in 3-dB steps

Power section

Power requirements	3.0 V DC (two LR6/size AA alkaline batteries)
Battery life	Approx. 8 hours at 25°C (77°F) with Sony LR6 alkaline batteries

General

Operating temperature	0°C to +50°C (32°F to 122°F)
Storage temperature	–30°C to +60°C (–22°F to +140°F)
Dimensions	63 × 103 × 17 mm (w/h/d) (2 1/2 × 4 1/8 × 11/16 inches)
Mass	Approx. 145 g (5.1 oz) including batteries

Supplied accessories
Operating Instructions (1)
Soft case (1)

Optional accessories
Lavalier microphones
ECM-44BC, ECM-55BC, ECM-66BC, ECM-77BC, ECM-166BC, ECM-310BC, ECM-350BC
Microphone cable
EC-1.5CF

Design and specifications are subject to change without notice.

1) 0 dBV = 1 Vrms

Wireless Channel Lists / Listes des canaux sans fil / Listas de canales inalámbricos

For 68-Version Model Using TV Channels 68 and 69 / Pour le modèle 68 utilisant les canaux de télévision 68 et 69 / Para modelos de la versión 68 que utilizan los canales de TV 68 y 69

Channel Canal	Frequency(MHz) Fréquence Frecuencia	Channel Canal	Frequency(MHz) Fréquence Frecuencia	Channel Canal	Frequency(MHz) Fréquence Frecuencia	Channel Canal	Frequency(MHz) Fréquence Frecuencia
68-01	794.125	68-25	797.125	69-01	800.125	69-25	803.125
68-02	794.250	68-26	797.250	69-02	800.250	69-26	803.250
68-03	794.375	68-27	797.375	69-03	800.375	69-27	803.375
68-04	794.500	68-28	797.500	69-04	800.500	69-28	803.500
68-05	794.625	68-29	797.625	69-05	800.625	69-29	803.625
68-06	794.750	68-30	797.750	69-06	800.750	69-30	803.750
68-07	794.875	68-31	797.875	69-07	800.875	69-31	803.875
68-08	795.000	68-32	798.000	69-08	801.000	69-32	804.000
68-09	795.125	68-33	798.125	69-09	801.125	69-33	804.125
68-10	795.250	68-34	798.250	69-10	801.250	69-34	804.250
68-11	795.375	68-35	798.375	69-11	801.375	69-35	804.375
68-12	795.500	68-36	798.500	69-12	801.500	69-36	804.500
68-13	795.625	68-37	798.625	69-13	801.625	69-37	804.625
68-14	795.750	68-38	798.750	69-14	801.750	69-38	804.750
68-15	795.875	68-39	798.875	69-15	801.875	69-39	804.875
68-16	796.000	68-40	799.000	69-16	802.000	69-40	805.000
68-17	796.125	68-41	799.125	69-17	802.125	69-41	805.125
68-18	796.250	68-42	799.250	69-18	802.250	69-42	805.250
68-19	796.375	68-43	799.375	69-19	802.375	69-43	805.375
68-20	796.500	68-44	799.500	69-20	802.500	69-44	805.500
68-21	796.625	68-45	799.625	69-21	802.625	69-45	805.625
68-22	796.750	68-46	799.750	69-22	802.750	69-46	805.750
68-23	796.875	68-47	799.875	69-23	802.875	69-47	805.875
68-24	797.000			69-24	803.000		

L-1

Wireless Channel Lists / Listes des canaux sans fil / Listas de canales inalámbricos

For 66-Version Model Using TV Channels 66 and 67 / Pour le modèle 66 utilisant les canaux de télévision 66 et 67 / Para modelos de la versión 66 que utilizan los canales de TV 66 y 67

Channel Canal	Frequency(MHz) Fréquence Frecuencia	Channel Canal	Frequency(MHz) Fréquence Frecuencia	Channel Canal	Frequency(MHz) Fréquence Frecuencia	Channel Canal	Frequency(MHz) Fréquence Frecuencia
66-01	782.125	66-25	785.125	67-01	788.125	67-25	791.125
66-02	782.250	66-26	785.250	67-02	788.250	67-26	791.250
66-03	782.375	66-27	785.375	67-03	788.375	67-27	791.375
66-04	782.500	66-28	785.500	67-04	788.500	67-28	791.500
66-05	782.625	66-29	785.625	67-05	788.625	67-29	791.625
66-06	782.750	66-30	785.750	67-06	788.750	67-30	791.750
66-07	782.875	66-31	785.875	67-07	788.875	67-31	791.875
66-08	783.000	66-32	786.000	67-08	789.000	67-32	792.000
66-09	783.125	66-33	786.125	67-09	789.125	67-33	792.125
66-10	783.250	66-34	786.250	67-10	789.250	67-34	792.250
66-11	783.375	66-35	786.375	67-11	789.375	67-35	792.375
66-12	783.500	66-36	786.500	67-12	789.500	67-36	792.500
66-13	783.625	66-37	786.625	67-13	789.625	67-37	792.625
66-14	783.750	66-38	786.750	67-14	789.750	67-38	792.750
66-15	783.875	66-39	786.875	67-15	789.875	67-39	792.875
66-16	784.000	66-40	787.000	67-16	790.000	67-40	793.000
66-17	784.125	66-41	787.125	67-17	790.125	67-41	793.125
66-18	784.250	66-42	787.250	67-18	790.250	67-42	793.250
66-19	784.375	66-43	787.375	67-19	790.375	67-43	793.375
66-20	784.500	66-44	787.500	67-20	790.500	67-44	793.500
66-21	784.625	66-45	787.625	67-21	790.625	67-45	793.625
66-22	784.750	66-46	787.750	67-22	790.750	67-46	793.750
66-23	784.875	66-47	787.875	67-23	790.875	67-47	793.875
66-24	785.000			67-24	791.000		

L-2

For 64-Version Model Using TV Channels 64 and 65 / Pour le modèle 64 utilisant les canaux de télévision 64 et 65 / Para modelos de la versión 64 que utilizan los canales de TV 64 y 65

Channel Canal	Frequency(MHz) Fréquence Frecuencia	Channel Canal	Frequency(MHz) Fréquence Frecuencia	Channel Canal	Frequency(MHz) Fréquence Frecuencia	Channel Canal	Frequency(MHz) Fréquence Frecuencia
64-01	770.125	64-25	773.125	65-01	776.125	65-25	779.125
64-02	770.250	64-26	773.250	65-02	776.250	65-26	779.250
64-03	770.375	64-27	773.375	65-03	776.375	65-27	779.375
64-04	770.500	64-28	773.500	65-04	776.500	65-28	779.500
64-05	770.625	64-29	773.625	65-05	776.625	65-29	779.625
64-06	770.750	64-30	773.750	65-06	776.750	65-30	779.750
64-07	770.875	64-31	773.875	65-07	776.875	65-31	779.875
64-08	771.000	64-32	774.000	65-08	777.000	65-32	780.000
64-09	771.125	64-33	774.125	65-09	777.125	65-33	780.125
64-10	771.250	64-34	774.250	65-10	777.250	65-34	780.250
64-11	771.375	64-35	774.375	65-11	777.375	65-35	780.375
64-12	771.500	64-36	774.500	65-12	777.500	65-36	780.500
64-13	771.625	64-37	774.625	65-13	777.625	65-37	780.625
64-14	771.750	64-38	774.750	65-14	777.750	65-38	780.750
64-15	771.875	64-39	774.875	65-15	777.875	65-39	780.875
64-16	772.000	64-40	775.000	65-16	778.000	65-40	781.000
64-17	772.125	64-41	775.125	65-17	778.125	65-41	781.125
64-18	772.250	64-42	775.250	65-18	778.250	65-42	781.250
64-19	772.375	64-43	775.375	65-19	778.375	65-43	781.375
64-20	772.500	64-44	775.500	65-20	778.500	65-44	781.500
64-21	772.625	64-45	775.625	65-21	778.625	65-45	781.625
64-22	772.750	64-46	775.750	65-22	778.750	65-46	781.750
64-23	772.875	64-47	775.875	65-23	778.875	65-47	781.875
64-24	773.000			65-24	779.000		

L-3

SONY

3-866-667-31 (1)

UHF Synthesized Transmitter

Operating Instructions

WRT-822A

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AU66

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Changing the Transmitting Channel 11
Changing the Input Attenuation Setting 12
Resetting the Accumulated Time Indication 13
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Precautions

- The unit is designed for use in ambient temperature range of 0°C to 50°C (32°F to 122°F).
- Do not place the unit on or near heat sources, such as lighting equipment, power amplifiers, or in a place subject to direct sunlight or excessive moisture. In such places, the external finish or internal parts of the unit may be damaged.
- If the unit is used in a very humid or dusty place or in a place subject to an active gas, clean its surface as well as the connectors with a dry, soft cloth soon after use. Lengthy use of the unit in such places or not cleaning it after its use in such places may shorten its life.
- When cleaning the unit, never use organic solvents such as thinners or benzine, which will damage the finish of the unit.
- The unit has been factory adjusted precisely. Do not tamper with its internal parts or attempt to repair it.

Overview

The WRT-822A ensures excellent sound quality of the microphone itself and provides the convenience especially for Electronic News Gathering (ENG), live and other Electronic Field Production (EFP) applications. Combining with 800 MHz band Sony UHF wireless microphone system, use this highly reliable transmitter for broadcast and movie production purpose.

Features

Phase Locked Loop (PLL) synthesized system
The WRT-822A has a refined phase locked loop (PLL) synthesizer circuit.

Compact and lightweight
Innovative high-density mounting technology and magnesium case have enabled the creation of this compact and lightweight transmitter, which lets you move anywhere for Electronic News Gathering (ENG) and Electronic Field Production (EFP).

Remote battery alarm on tuner
This transmitter has capability of transmitting "Battery status information" to Sony tuners which support the battery status indication on both transmitter and tuner.
The information is sent to the tuners in approx. one hour advance to battery exhaust so that they can safely replace batteries of the transmitter.

Operation powered by easily available batteries
The built-in high efficiency DC-DC converter allows stable operation, for about 8 hours continuously, with two LR6 (size AA) alkaline batteries.

LCD for coordinated operation control
The built-in CPU controls operation of the unit, including the PLL circuit function. The LCD shows the current

channel number/frequency, the residual battery power, input attenuation setting, AF input level and RF output.
An accumulated operation time indication is also provided for simple control of the time of battery use (in one-minute increments).

Saved channel and input attenuation settings
The unit stores the channel and the input attenuation setting when it is turned off. The saved settings are retained even if the batteries are removed. Therefore, when using the unit next time, you need not make the same settings again.

Highly reliable electronic attenuator
The built-in input level attenuator is adjustable in a range of 0 to 21 dB in 3-dB steps. It reduces signal distortion when an excessively strong audio signal is inputted.

Compatibility with Sony lavalier microphone
The transmitter is compatible with Sony lavalier microphones, including the ECM-77BC.

RF carrier with tone signal
The unit transmits the RF carrier accompanied by a tone signal, enabling the tuner with a tone squelch circuit to take out only the target audio signal received.

Wide dynamic range and low noise
The compander (compressor/expander) system enables transmission over a wide dynamic range with minimum noise

System Configuration

The WRT-822A can be used with the tuners listed below.

Sony 800 MHz band system models

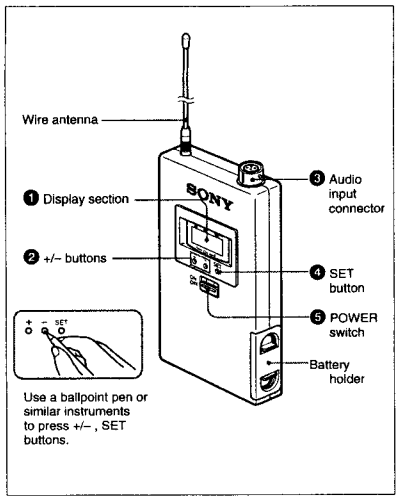
Frequency band		Model name	
TV channel	Frequency (MHz)	Transmitter or microphone	Tuner
66	792.250 - 798.500	WRT-805A(66)	WRR-805A(66)
		WRT-810A(66)	WRR-810A(66)
67	799.250 - 805.500	WRT-820A(66)	WRR-840A(66)[a]
		WRT-822A(66)	WRR-860A(66)

a) For this models, the AN-820A UHF antenna and the WD-820A UHF antenna divider are required.

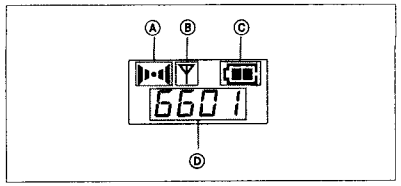
Wireless Channels Selectable

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
66-01	792.250	66-27	795.500	67-01	799.250	67-27	802.500
66-02	792.375	66-28	795.625	67-02	799.375	67-28	802.625
66-03	792.500	66-29	795.750	67-03	799.500	67-29	802.750
66-04	792.625	**66-30**	**795.875**	67-04	799.625	**67-30**	**802.875**
66-05	792.750	66-31	796.000	67-05	799.750	67-31	803.000
66-06	792.875	66-32	796.125	67-06	799.875	67-32	803.125
66-07	793.000	66-33	796.250	67-07	800.000	67-33	803.250
66-08	793.125	66-34	796.375	67-08	800.125	67-34	803.375
66-09	793.250	66-35	796.500	67-09	800.250	67-35	803.500
66-10	**793.375**	66-36	796.625	**67-10**	**800.375**	67-36	803.625
66-11	793.500	66-37	796.750	67-11	800.500	67-37	803.750
66-12	793.625	66-38	796.875	67-12	800.625	67-38	803.875
66-13	793.750	66-39	797.000	67-13	800.750	67-39	804.000
66-14	793.875	**66-40**	**797.125**	67-14	800.875	**67-40**	**804.125**
66-15	794.000	66-41	797.250	67-15	801.000	67-41	804.250
66-16	794.125	66-42	797.375	67-16	801.125	67-42	804.375
66-17	794.250	66-43	797.500	67-17	801.250	67-43	804.500
66-18	794.375	66-44	797.625	67-18	801.375	67-44	804.625
66-19	794.500	66-45	797.750	67-19	801.500	67-45	804.750
66-20	**794.625**	66-46	797.875	**67-20**	**801.625**	67-46	804.875
66-21	794.750	66-47	798.000	67-21	801.750	67-47	805.000
66-22	794.875	66-48	798.125	67-22	801.875	67-48	805.125
66-23	795.000	66-49	798.250	67-23	802.000	67-49	805.250
66-24	795.125	**66-50**	**798.375**	67-24	802.125	**67-50**	**805.375**
66-25	795.250	66-51	798.500	67-25	802.250	67-51	805.500
66-26	795.375			67-26	802.375		

Parts Identification


Wire antenna
❶ Display section
❷ +/– buttons
❸ Audio input connector
❹ SET button
❺ POWER switch
Battery holder
Use a ballpoint pen or similar instruments to press +/–, SET buttons.

❶ Display section



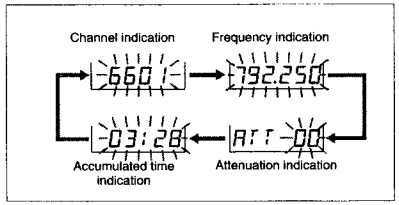
Ⓐ AF (audio input) indication
Lights when an audio signal over the reference level is being supplied.

Ⓑ RF (antenna output) indication
Lights when a signal is being transmitted from the antenna.

Ⓒ BATT (battery) indication
Displays the status of the batteries.
See "Battery indication" on page 9.

Ⓓ CH (channel) indication
Displays the transmission channel.
Each time you press the SET button in normal Transmit mode, the channel indication changes to the frequency, input attenuation and accumulated time indications as shown on the next page.

Parts Identification



In Attenuation indication mode, it displays the input attenuation setting in dB, which can be changed in a range of 0 to 21 dB in 3-dB steps.
In Accumulated time indication mode, it displays the accumulated time of battery use (in one-minute increments).
For adjustments, see "Changing the Transmitting Channel" on page 11, "Changing the Input Attenuation Setting" on page 12 or "Resetting the Accumulated Time Indication" on page 13.

❷ + (+ selection) / – (– selection/reset) buttons

In setting mode, select the transmission channel, frequency and attenuator level using either of these buttons, or reset the time-of-use indication to "00:00" with the – button.
For Setting mode, see "Settings" on page 11.

❸ Audio input connector

Connect the output connector of the following Sony lavalier microphones: ECM-44BC, ECM-55BC, ECM-66BC, ECM-77BC, ECM-166BC, ECM-310BC, ECM-350BC.
You can also use your wired microphone by connecting it to this connector with an optional EC-1.5CF microphone cable.
See "Connections" on page 10.

❹ SET button

In normal Transmit mode, this button changes the indication items of the display section as shown on the left column.
In Setting mode, this button selects the item to be set. To initiate the setting mode, set the POWER switch to ON while holding this button down.
For setting the transmit channel, input attenuation or resetting the time-of-use indication in Setting mode, see "Settings" on page 11.

❺ POWER switch

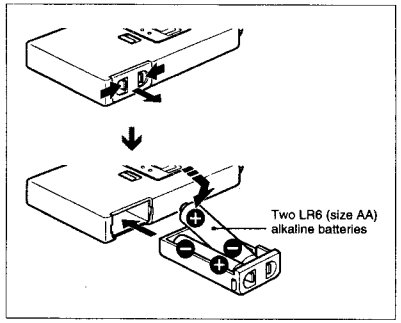
Turns the power of the transmitter ON or OFF.
When you set this switch to ON without holding any other button, the transmitter is set to normal Transmit mode and transmits the signal of the selected channel.
When you set this switch to ON while holding the SET button down, Setting mode is initiated. No signal is transmitted in Setting mode.

Note

Be sure to connect a microphone before turning the power ON.

Power Supply

The transmitter can operate on two LR6 (size AA) alkaline batteries continuously for about 8 hours at 25°C (77°F).



Installing the batteries

1 Slide the battery-holder catches inward (in the direction of the arrows ➡ ⬅) to take out the battery holder.

2 Match the polarities and insert the batteries.

3 Set the battery holder in the original position.

Battery indication

When you turn the power on, the battery status appears in the BATT indication on the display section.

	1	2	3	4
BATT indication	Lights	Lights	Flashes	Goes off
Battery condition	Good	Less than half-charge	Almost exhausted	Completely exhausted

When the batteries reach stage 3 shown in the table, the battery indication on the tuner also starts flashing.

Note

The indication may be incorrect if the batteries are not new when installed. If you plan to use the transmitter for a long period, it is best to replace the batteries with new ones.

Notes on batteries

- Use new alkaline batteries.
- Do not pair different types of batteries.
- Always replace the two batteries together.
- The batteries are not rechargeable.
- Be careful to install the batteries with the correct polarity.
- When not using the transmitter for a long period, remove the batteries to avoid leakage. If the batteries do leak, clean all leakage from the battery holder case and the unit. Leakage left in the holder case and the unit may cause poor battery contact. If there seems to be poor battery contact, consult your Sony dealer.

Connections

Caution

When connecting a microphone to the unit, be sure to turn the unit off.

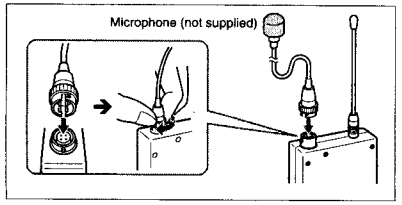
To connect a microphone

The WRT-822A accepts the following Sony lavalier microphones:

ECM-44BC ECM-55BC ECM-66BC
ECM-77BC ECM-166BC
ECM-310BC ECM-350BC

You can also use your wired microphone by connecting it to this connector with an optional EC-1.5CF microphone cable.

To secure the microphone cable connection, be sure to turn and lock the connector cover as illustrated below.



For the input attenuation adjustment, see page 12.

Notes on Microphone System Operation

- To operate with two or more channels, maintain a distance of at least 30 cm (one ft.) between each pair of transmitters.
  For details of operation with two or more channels, refer to the Operating Instructions for the tuner which is used with the WRT-822A.
- Ensure that the tuners set to channels not being used are either turned off or set to the minimum output level.
- When powering the transmitter on or off, to keep the noise to a minimum, set the audio output level from the tuner or mixer to a minimum.
- Powering the transmitter on without checking the channel selection first may interfere with the operation of other microphones/transmitters, if the current setting is already being used.
- To prevent noise generation, keep the transmitters at least 3 m (10 feet) away from the antennas when the system is operated using a group which allows selection of up to 11 channels, and at least 6 m (20 feet) away when using a group which allows selection of 12 channels.

Settings

Initiating Setting Mode

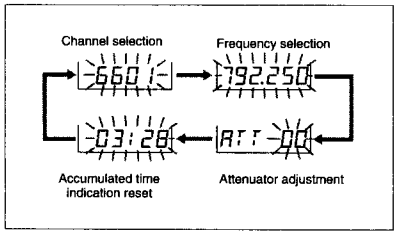
In Setting mode, you can change the transmission channel/frequency and the attenuation level, or reset the accumulated time indication.

To enter Setting mode

While holding down the SET button, set the POWER switch to ON.

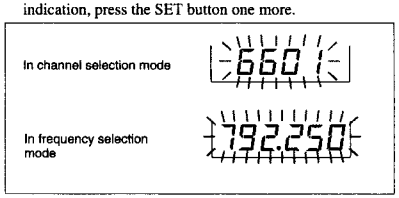
The transmitter enters Setting mode and the indication before the transmitter was previously turned OFF flashes on the display section.

Each time you press the SET button, the setting items are cyclically switched as shown below.



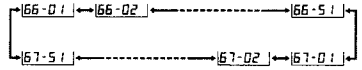
Changing the Transmitting Channel

1 Confirm that the channel number flashes on the display. If not, set the unit in Setting mode, and press the SET button so that the channel number flashes.
If you want to change the channel in frequency indication, press the SET button one more.



2 Press the + or – button to select the channel.

Pressing the + button cyclically changes the channel indication in the order shown on page 6.
Pressing the – button changes it in reversed order.
If you keep either button pressed, the channel number will be incremented or decremented successively.



3 Once the desired channel number appears, set the POWER switch to OFF to release Setting mode.

Or, press the SET button to continue operations in Setting mode.

The next time you turn on the power only by setting the POWER switch to ON, the transmitter will be set to Transmit mode with the selected channel.

Notes

- The unit cannot transmit in Setting mode.
- Make sure that the channel selected is the same as that selected on the tuner used in the same system.
- Depending on the noise or interference conditions, the selectable channels may not necessarily all be usable. If necessary, you can determine the usable channels by stepping the channel selection through a number of channels on the tuner with the microphone/transmitter set to OFF. Those channels on which the RF indicator of the tuner does not light are usable.
- If there is a TV broadcasting station near by, do not use the station's channel.
- The unit may not operate correctly if it is turned on again immediately after turning off the power while in setting mode. Pause for a few seconds or more before turning on the power again.
- When operating two or more UHF wireless microphone systems using channels in different groups, ensure that the systems are at least 100 m (330 feet) apart from each other. (The same applies also when using channels in a group if the different UHF wireless microphone systems are installed where they are within sight of each other.)

Changing the Input Attenuation Setting

You can change the input attenuation setting in 3-dB steps in a range of 0 to 21 dB. You can change it either in Setting mode or in Transmit mode.

Changing in Setting mode

1 Set the unit in Setting mode.

2 Press the SET button until the attenuation level indication appears on the display.

3 Press the + or – button to select the attenuation level.

If you keep either button pressed, the level will be incremented or decremented successively.

4 Once the desired level appears, set the POWER switch to OFF to release Setting mode.
Or, press the SET button to continue operations in Setting mode.

The next time you turn on the power only by setting the POWER switch to ON, the transmitter will be set to Transmit mode with the selected attenuation setting.

Changing in Transmit mode

You can also change the input attenuation level during transmission.

1 If the attenuation level is not displayed, press the SET button until the attenuation level indication appears on the display.

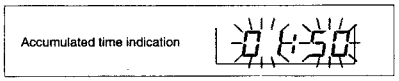
2 Press the + or – button to select the level.

Resetting the Accumulated Time Indication

The time indication accumulates time in hours and minutes when the WRT-822A is on.
Reset the indication to "00:00" whenever you replace the batteries so that it can display the running time of the batteries.

1 Set the unit in Setting mode.

2 Press the SET button until the accumulated time indication appears on the display.



3 Press the – button.
The time indication resets to "00:00."
While you see "00:00" indication, you can go back to previous value by pressing the + button.

4 Set the POWER switch to OFF to release Setting mode.

Error Messages

When a problem occurs, one of the following error messages may appear on the display.

Messages	Contents	Measures
Error 11	An error occurred in backup memory data.	The data was initialized. Set the transmitting channel and the input attenuation again.
Error 21	The PLL synthesized circuit is in trouble.	Contact your Sony dealer.
Error 31	The battery voltage exceeds the allowable value.	Use the specified batteries.
Error 41	Defect of an internal circuit	Contact your Sony dealer.
Error 51	Defect of the A/D converter	
Error 61	Defect of an internal circuit	

Specifications

Transmitter and modulator section

Oscillator	Crystal controlled PLL synthesizer
Type of emission	F3E
Carrier frequencies	792 to 806 MHz
RF power output	10 mW
Frequency stability	Within ±0.005%
Tone signal	32.768 kHz
Type of antenna	1/4-wavelength wire
Pre-emphasis	50 µs
Deviation	±5 kHz (–60 dBV [1], 1 kHz input with 0 dB audio attenuation)
Frequency response	70 to 13,000 Hz
Signal-to-noise ratio	60 dB or more (A-weighted, with reference deviation at WRR-800A/801A/805A/ 810A/820A/840A/850A/855A/860A)
Audio attenuator	0 to 21 dB, variable in 3-dB steps

Power section

Power requirements	3.0 V DC (two LR6/size AA alkaline batteries)
Battery life	Approx. 8 hours at 25°C (77°F) with Sony LR6 alkaline batteries

General

Operating temperature	0°C to +50°C (32°F to 122°F)
Storage temperature	–30°C to +60°C (–22°F to +140°F)
Dimensions	63 × 103 × 17 mm (w/h/d) ($2^1/_2 \times 4^1/_8 \times {}^{11}/_{16}$ inches)
Mass	Approx. 145 g (5.1 oz) including batteries

Supplied accessories
Operating Instructions (1)
Soft case (1)

Optional accessories
Lavalier microphones
ECM-44BC, ECM-55BC, ECM-66BC, ECM-77BC, ECM-166BC, ECM-310BC, ECM-350BC
Microphone cable
EC-1.5CF

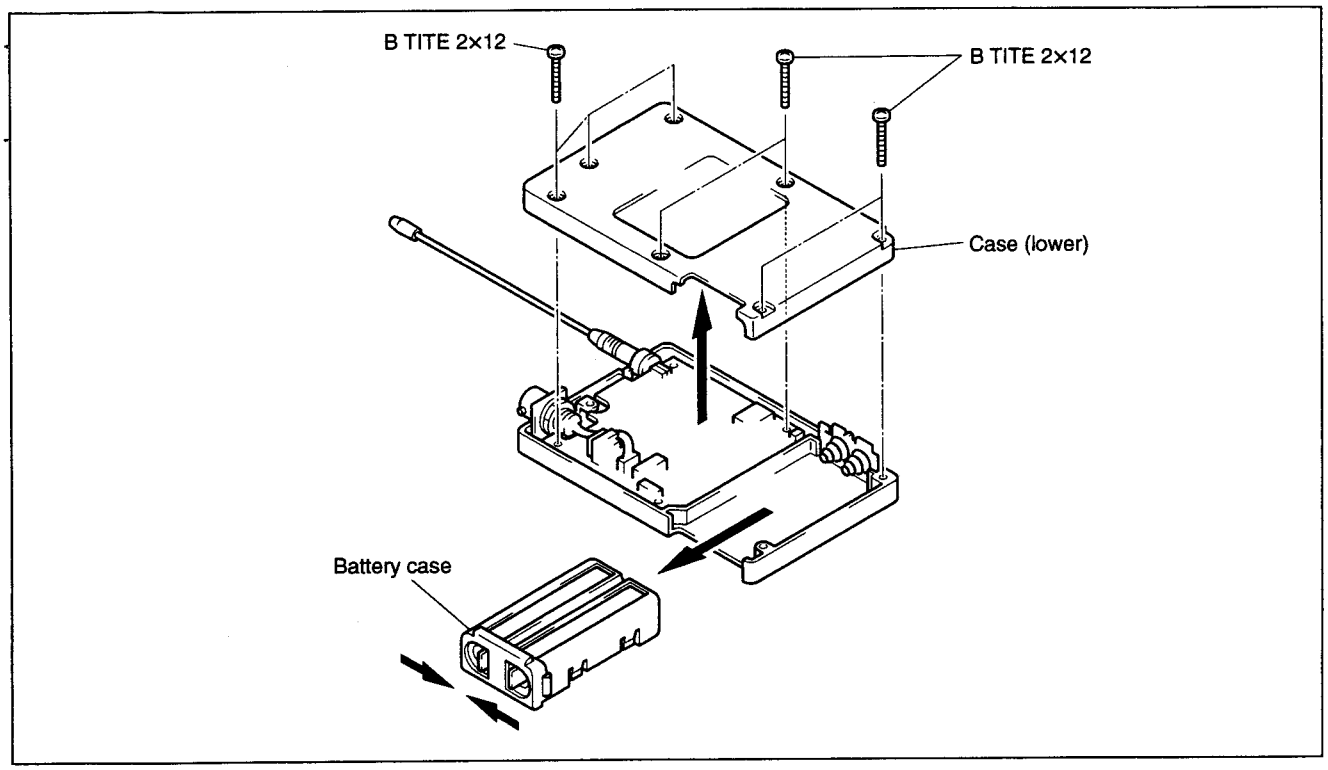
Design and specifications are subject to change without notice.

1) 0 dBV = 1 Vrms

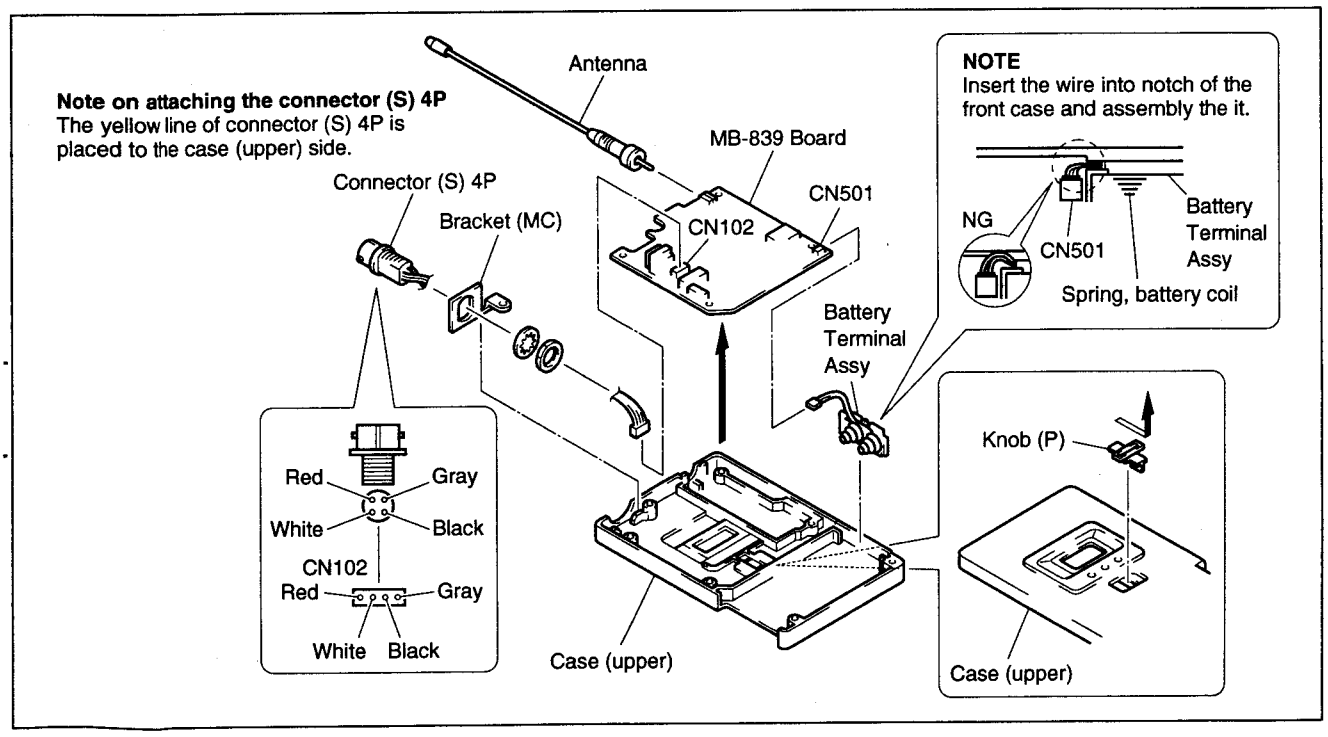
Section 2
Service Overview

2-1. Disassembly

Case (lower) /Battery case



Audio Connector/MB-839 Board/Case (Upper)



2-2. Notes on Parts Replacement

2-2-1. EEPROM (IC405) Replacement

When replacing EEPROM (IC405) on the MB-839 board or replacing MB-839 board, perform the following operation.
When the power is turned on initially after the replacement:

1. "ERR-11" is indicated on the display.
2. Turn off the power, Next turn on the power again.
   Confirm that "6401" (for U64 model) is indicated on the display.
   Confirm that "6601" (for U66 model) is indicated on the display.
   Confirm that "6801" (for U68 model) is indicated on the display.
   Confirm that "6601" (for AU66 model) is indicated on the display.

2-3. Error Messages

When a problem occurs, one of the following error messages may appear on the display.

Messages	Contents	Measures
Error 11	An error occurred in backup memory data.	The data was initialized. Set the transmitting channel and the input attenuation again.
Error 21	The PLL synthesized circuit is in trouble.	Check the PLL synthesized circuit (IC300, CP300, and its peripheral circuit) on MB-839 board.
Error 31	The battery voltage exceeds the allowable value.	Use the specified batteries.

Section 3
Electrical Alignment

3-1. Equipment and Tools

Equipment Required

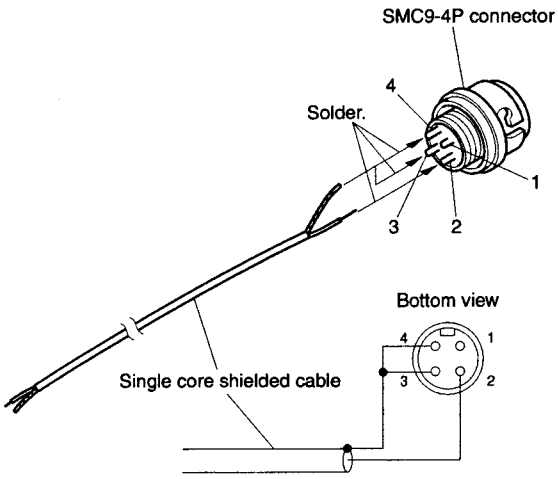
Name	Specifications	Model Name
DC Power Supply	Output regulated voltage: 0 to 5 V, 2 A	–
DC Ammeter	Measurement range: 300 mA	–
Spectrum Analyzer	Frequency: 10 kHz to 4 GHz	ADVANTEST R3371B or equivalent
Modulation Analyze	RF input Frequency: 150 kHz to 3 GHz	ANRITSU MS616A or equivalent
RF Power Meter with Power sensor	Range: 3 µW to 100 mW	HEWLETT PACKARD 435B (with Power sensor HEWLETT PACKARD 8482A) or equivalent
Audio Analyzer	Oscillator: 20 Hz to 100 kHz Distortion meter S/N meter Level meter	HEWLETT PACKARD 8903B (with A-weight filter) or equivalent
Frequency Counter	Frequency: 10 Hz to 1000 MHz Effective digits: 10 digits Resolution: 0.1 Hz	HEWLETT PACKARD 5385A or equivalent
Oscilloscope	Frequency: DC to 10 MHz	–
Digital Volt Meter	Effective digits: $3^1/_2$ digits	–

Tools Required

Name	Part No.	Remarks
MM-SMA (J) connector	J-6402-480-A	For RF signal input
SMA-BNC (J) connector	J-6402-490-A	For RF signal input
Mic input cable	–	Refer to "How to make a Mic input cable".
Adjustor (0.4 x 1.3 mm)	7-721-052-81	

How to make a Mic input cable

Required parts
SMC9-4P connector: 1 (Part No. 1-560-155-00)
Single-core shielded cable



3-2. Adjustments

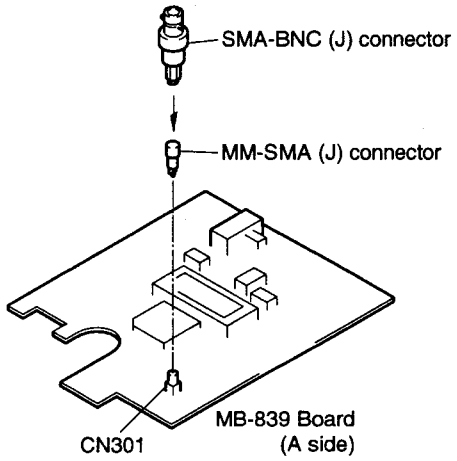
This section describes the following adjustments and checks required to satisfy specifications.

Adjustment and Check Items

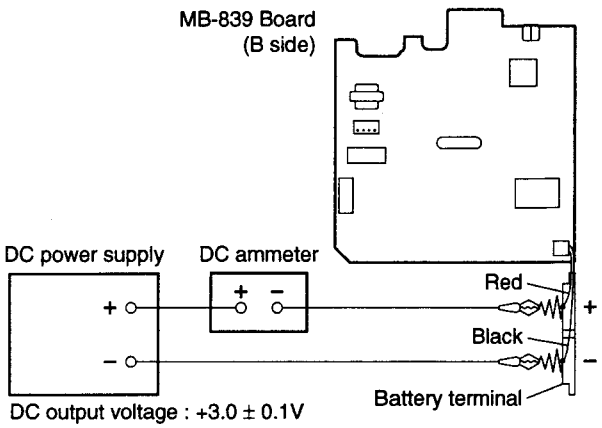
3-2-1. Power Supply Voltage Check
3-2-2. Carrier Frequency Adjustment
3-2-3. RF Power Output Adjustment
3-2-4. Reference Frequency Deviation Adjustment
3-2-5. Maximum Frequency Deviation Adjustment
3-2-6. Distortion Ratio Check
3-2-7. S/N Check
3-2-8. Frequency Characteristics Check
3-2-9. Tone Signal Adjustment
3-2-10. Battery Alarm Signal Check
3-2-11. Spurious Emissions Check

Preparation

1. When adjustments are performed, remove the MB-839 board (with battery terminal and Mic input connector) from WRT-822A unit.
   Refer to the "Section 2. Service Overview" for removal.
2. Connect the MM-SMA (J) connector (J-6402-480-A) with SMA-BNC (J) connector (J-6402-490-A) to the antenna connector (CN301) on the MB-839 board as shown below.



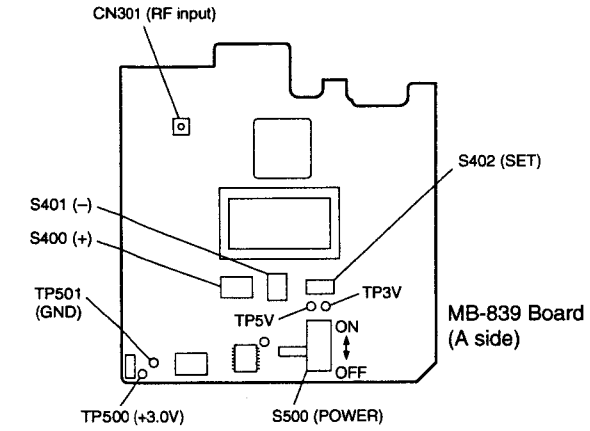
3. Connecting the DC power supply.
   Supply the DC power to the battery terminal springs as shown below.

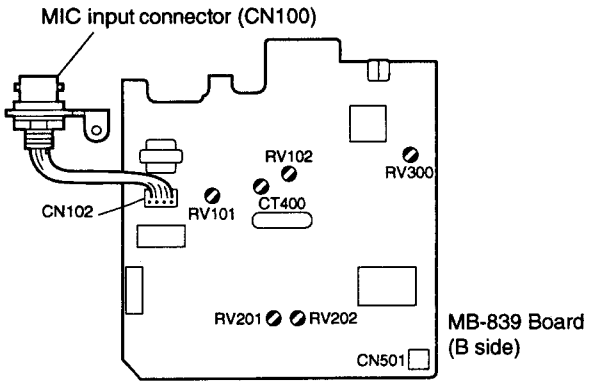


Check

After the DC power supply connection is completed, set the power switch (S500) to ON, and check the level on DC ammeter.
DC ammeter indication level: 140 to 160 mA

Adjustment Location





3-2-1. Power Supply Voltage Check

Equipment and Tools Required

DC power supply
  DC output voltage: +3.0 ±0.1 V dc
DC ammeter
DC volt meter (or Digital multimeter)
Adjuster (Sony Part No. 7-721-052-81)

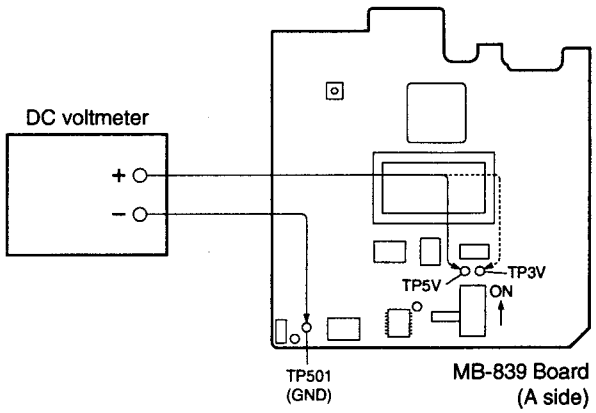
Switch and Control Setting

The following setting is to be perform with the SET switch (S402), "+" switch (S400) and "–" switch (S401).
Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

Procedure

(1) Set the POWER switch (S500) on the MB-839 board to ON.
(2) Check the DC Voltage of the TP5V terminal to the specified voltage as below:
  Specification: DC Voltage at TP5V terminal
  = +5.0 ±0.1 V dc (For Vcc1)

(3) Check the DC voltage of the TP3V terminal to the specified voltage as below:
  Specification: DC voltage at TP3V terminal
  = +3.3 ±0.1 V dc (For Vcc2)



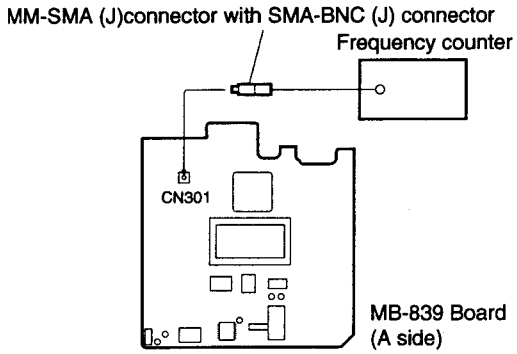
3-2-2. Carrier Frequency Adjustment

Equipment and Tools

DC power supply
  DC output voltage: +3.0 ±0.1 V dc
DC ammeter
Frequency counter
Adjustor (Sony Part No. 7-721-052-81)
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)

Connections

(For connecting the DC power supply, refer to the "Preparations" on page 3-2.)



Switch and Control Setting

The following setting is to be perform with the SET switch (S402), "+" switch (S400) and "−" switch (S401).
Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

Procedure

(1) Connect the frequency counter to the antenna connector (CN301) with MM-SMA (J) and SMA-BNC (J) connectors.
(2) Adjust ⊘CT400 so that the frequency counter reading meets the following specification.
  Specification: Carrier frequency mentioned in the table below.

WRT-822A	Carrier frequency
U64 model	776.125 MHz ±1 kHz
U66 model	788.125 MHz ±1 kHz
U68 model	800.125 MHz ±1 kHz
AU66 model	799.250 MHz ±1 kHz

Adjustment: ⊘CT400/MB-839 Board (B side)

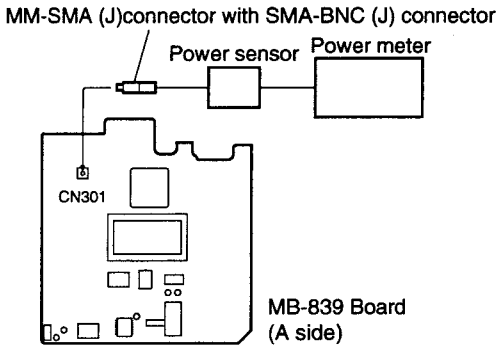
3-2-3. RF Power Output Adjustment

Equipment and Tools

DC power supply
  DC output voltage: +3.0 ±0.1 V dc
DC ammeter
Power meter (with power sensor)
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)
Adjustor (Sony Part No. 7-721-052-81)

Connections

(For connecting the DC power supply, refer to the "Preparations" on page 3-2.)



Switch and Control Setting

The following setting is to be perform with the SET switch (S402), "+" switch (S400) and "−" switch (S401).
Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

Procedure

(1) Connect the power meter (with power sensor) to the antenna connector (CN301) with MM-SMA (J) and SMA-BNC (J) connectors.
(2) Adjust ⊘RV300 so that the power meter reading meets the following specification.
  Specification:
  Power meter reading = 10 ±3 mW (U64/U66/U68 models)
  $10.0\ ^{+0.5}_{-3.0}$ mW (AU66 model)
  Adjustment: ⊘RV300/MB-839 board (B side)

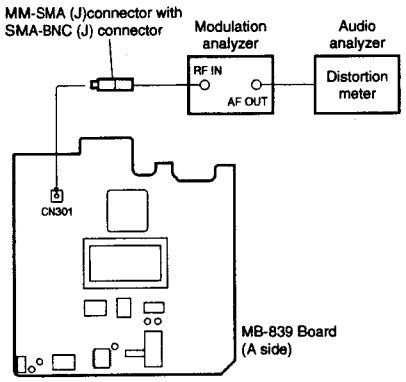
3-2-4. Reference Frequency Deviation Adjustment

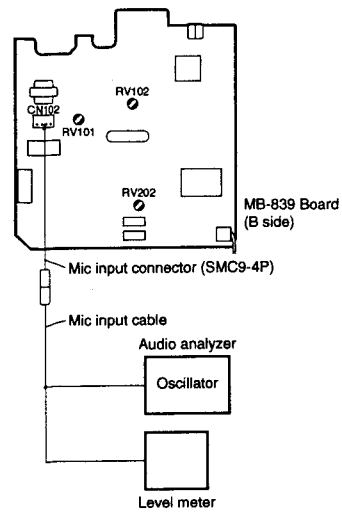
Equipment and Tools

DC power supply
  DC output voltage: +3.0 ±0.1 Vdc
DC ammeter
Audio analyzer
Modulation analyzer
  MEASUREMENT: FM
  MEASUREMENT RANGE: AUTO or ±10 kHz (manual operation)
  HPF: 50 Hz
  LPF: 20 kHz or 15 kHz
  DE EMPHASIS: 50 µs
Adjustor (Sony Part No.. 7-721-052-81)
Mic input cable (See page 3-1.)
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)

Connections

(For connecting the DC power supply, refer to the "Preparations" on page 3-2.)





Switch and Control Setting

The following setting is to be perform with the SET switch (S402), "+" switch (S400) and "−" switch (S401).

Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

Procedure

(1) Input 1 kHz, −60 dBV (−57.8 dBm) signal to the MIC input connector (CN100) with Mic input cable.
(2) Adjust ⊘RV102 so that the frequency deviation for the modulation analyzer reading meets the following specification.
  Specification: Frequency deviation = Maximum
  Adjustment: ⊘RV102/MB-839 board (B side)

(3) Adjust ⊘RV101 so that the frequency deviation for the modulation analyzer reading meets the following specification.
  Specification: Frequency deviation = Maximum
  Adjustment: ⊘RV101/MB-839 board (B side)

(4) Adjust ⊘RV202 so that the frequency deviation for the modulation analyzer reading meets the following specification.
  Specification: Frequency deviation = ±5 kHz ±0.1 kHz
  Adjustment: ⊘RV202/MB-839 board(B side)

(5) After the adjustment has been completed, perform the "3-2-5. Maximum Frequency Deviation Adjustment".

3-2-5. Maximum Frequency Deviation Adjustment

Note

Be sure to perform this adjustment after "3-2-4. Reference Frequency Deviation Adjustment" has been completed.

Equipment and Tools

DC power supply
  DC output voltage: +3.0 ±0.1 V dc
DC ammeter
Audio analyzer
Modulation analyzer
  MEASUREMENT: FM
  MEASUREMENT RANGE: AUTO or ±100 kHz
  HPF: 50 Hz
  LPF: 15 kHz or 20 kHz
  DE EMPHASIS: 50 µs
Oscilloscope
Adjustor (Sony Part No. 7-721-052-81)
MIC input cable (See page 3-1.)
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)

Connections

Same as "3-2-4. Reference Frequency Division adjustments".

Switch and Control Setting

The following setting is to be perform with the SET switch (S402), "+" switch (S400) and "−" switch (S401).

Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

Procedure

• For U64/U66/U68 models

(1) Input 1 kHz, −24dBV (−21.8 dBm) signal to the MIC input connector (CN100) with Mic input cable.
(2) Adjust ⊘RV101 so that the frequency deviation for the modulation analyzer reading meets the following specification.
  Specification: Frequency deviation = $\pm 38\ ^{+1}_{-2}$ kHz
  Adjustment: ⊘RV101/MB-839 board (B side)

• For AU66 model

(1) Input 10 kHz, −24 dBV (−21.8 dBm) signal to the MIC input connector (CN100) with Mic input cable.
(2) Adjust ⊘RV102 so that the frequency deviation for the modulation analyzer reading meets the following specification.
  Specification: Frequency deviation = Maximum
  Adjustment: ⊘RV102/MB-839 board (B side)

(3) Input 1 kHz, −24 dBV (−21.8 dBm) signal to the MIC input connector (CN100) with Mic input cable.
(4) Adjust ⊘RV101 so that the frequency deviation for the modulation analyzer reading meets the following specification.
  Specification: Frequency deviation
  = ±26 kHz ±0.5 kHz
  Adjustment: ⊘RV101/MB-839 board (B side)

(5) Adjust ⊘RV102 so that the frequency deviation for the modulation analyzer reading meets the following specification.
  Specification: Frequency deviation
  = ±24.5 kHz ±0.5 kHz
  Adjustment: ⊘RV102/MB-839 board (B side)

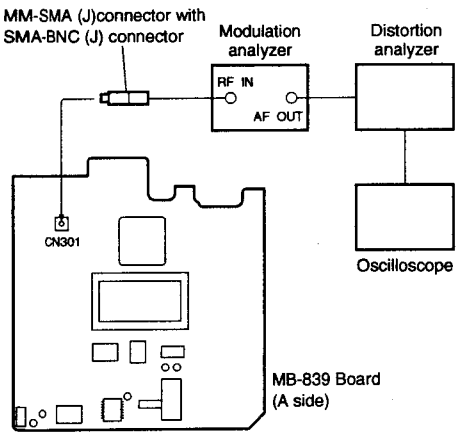
3-2-6. Distortion Ratio Check

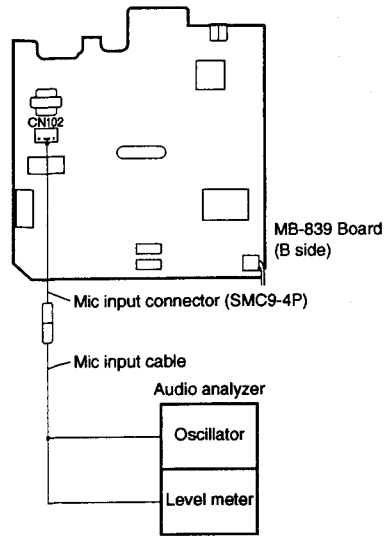
Equipment and Tools

DC power supply
  DC output voltage: +3.0 ±0.1 V dc
DC ammeter
Audio analyzer
Modulation analyzer
  MEASUREMENT: FM
  MEASUREMENT RANGE: AUTO or ±40 kHz
  HPF: 50 Hz
  LPF: 15 kHz or 20 kHz
  DE EMPHASIS: 50 µs
Oscilloscope
MIC input cable (See page 3-1.)
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)

Connections

(For connecting the DC power supply, refer to the "preparations" on page 3-2.)





Switch and Control Setting

The following setting is to be perform with the SET switch (S402), "+" switch (S400) and "−" switch (S401).

Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

Procedure

(1) Connect the audio analyzer (distortion analyzer) to the AF OUT connector on the modulation analyzer.
(2) Set the audio analyzer to distortion measurement (distortion mode).
(3) Input 1 kHz, −60 dBV (−57.8 dBm) signal to the MIC input connector (CN100) with Mic input cable from audio analyzer (oscillator).
(4) Check that the distortion analyzer reading is less than 0.90 %.
(5) Input 1 kHz, −27 dBV (−24.8 dBm) signal to the MIC input connector (CN100) with Mic input cable.
(6) Check that the distortion analyzer reading is less than 0.9 % (For U64/U66/U68 models) / 3 % (For AU66 model).

3-2-7. S/N Check

Equipment and Tools

DC power supply
  DC output Voltage: +3.0 ±0.1 V dc
DC ammeter
Audio analyzer
Modulation analyzer
  MEASUREMENT: FM
  MEASUREMENT RANGE: ±40 kHz
  HPF: 50 Hz
  LPF: 15 kHz for HEWLETT PACKARD equipment
  20 kHz for ANRITSU equipment
  DE EMPHASIS: 50 µs
MIC input cable (See page 3-1.)
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)

Connections

Same as "3-2-6. Distortion Ratio Check".

Switch and Control Setting

The following setting is to be perform with the SET switch (S402), "+" switch (S400) and "−" switch (S401).

Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

Procedure

(1) Connect the audio analyzer (level meter) to the AF OUT connector on the modulation analyzer.
(2) Input 1 kHz, −60 dBV (−57.8 dBm) signal to the MIC input connector (CN100) with Mic input cable from audio analyzer (oscillator).
(3) Set the audio analyzer to S/N measurement (with A-weighted filter).
(4) Check that the S/N reading is more than 32dB. (with MIC input connector short-circuited).

3-2-8. Frequency Characteristics Check

Equipment and Tools

DC power supply
  DC output Voltage: +3.0 ±0.1 V dc
DC ammeter
Audio analyzer
Modulation analyzer
  MEASUREMENT: FM
  MEASUREMENT RANGE: ±40 kHz
  HPF: 50 Hz
  LPF: 15 kHz or 20 kHz
  DE EMPHASIS: 50 µs
Oscilloscope
MIC input cable (See page 3-1.)
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)

Connections

Same as "3-2-6. Distortion Ratio Check".

Switch and Control Setting

The following setting is to be perform with the SET switch (S402) , "+" switch (S400) and "−" switch(S401).

Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

Procedure

(1) Connect the audio analyzer (level meter) to the AF OUT connector for the modulation analyzer.
(2) Set the audio analyzer to level meter mode.
(3) Input 1 kHz, −60 dBV (−57.8 dBm) signal to the Mic input connector (CN100) with Mic input cable from audio analyzer (oscillator).
(4) Reads the indication on the audio analyzer (level meter) .
(5) Set the SENSITIVITY on the audio analyzer (level meter) so that the audio analyzer (level meter) reads 0 dB.
(6) Switch the oscillation frequency for the audio analyzer (oscillator) from 1 kHz to 100 Hz.
(7) Check that audio analyzer (level meter) reading is 0 ± 1.0 dB.
(8) Next, switch the oscillation frequency for the audio analyzer (oscillator) from 100 Hz to 10 kHz.
(9) Check that the reading for the audio analyzer (level meter) is 0.5 ±1.5 dB (For U64/U66/U68 models) / 1.5 ±1.2dB (For AU66 model).

3-2-9. Tone Signal Adjustment

Equipment and Tools

DC power supply
  DC output Voltage: +3.0 ±0.1 V dc
DC ammeter
Frequency counter
Spectrum analyzer
Modulation analyzer
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)

Switch and Control Setting

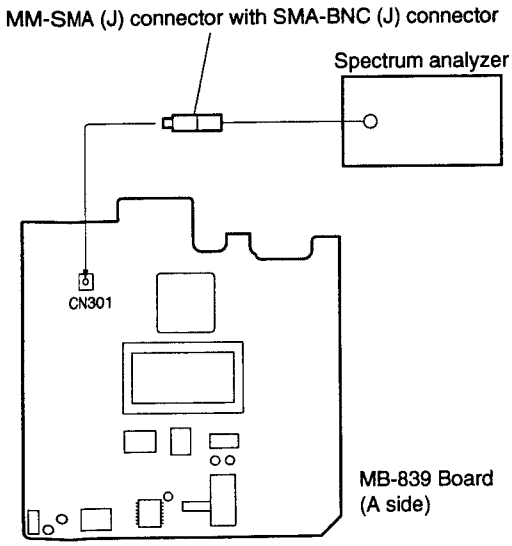
The following setting is to be perform with the SET switch (S402) , "+" switch (S400) and "−" switch (S401).

Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

1. Frequency deviation adjustment

Connections

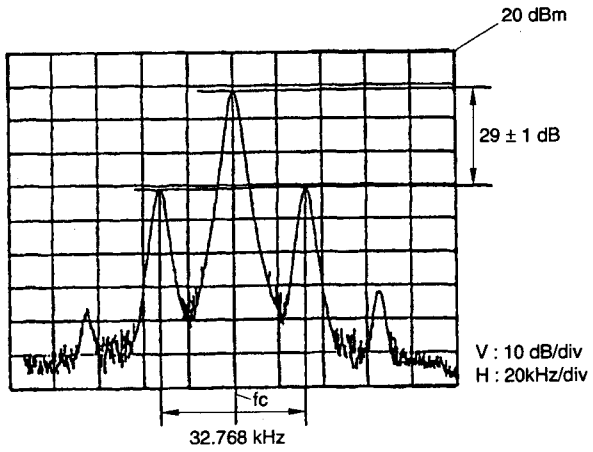
(For connecting the DC power supply, refer to the "Preparations" on page 3-2.)



Procedure

(1) Set the spectrum analyzer as follows:
  CENTER FREQUENCY(fc):
    U64 model: 776.125 MHz
    U66 model: 788.125 MHz
    U68 model: 800.125 MHz
    AU66 model: 799.250 MHz
  REFERENCE LEVEL: 20 dBm
  FREQUENCY SPAN: 200 kHz (20 kHz/DIV)
  RBW (resolution band width): 3 kHz
  VBW (video band width): 1 kHz
  ATT: 20 dB

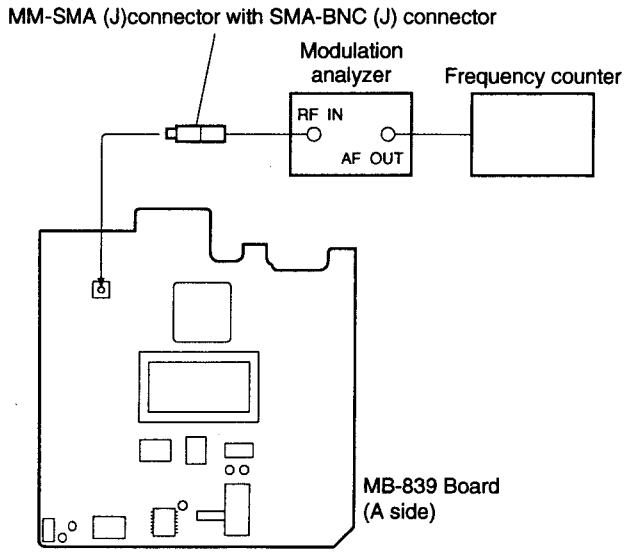
(2) Adjust ⊘RV201 so that level between carrier frequency (frequency center level) on spectrum analyzer and tone signal is within 29 dB ±1 dB.



2. Frequency check

Connections

(For connecting the DC power supply, refer to the "Preparations" on page 3-3.)



Procedure

Note

Perform the checking with the Mic input connector (SMC9-4P) short-circuit.

(1) Set the modulation analyzer as follows:
MEASUREMENT: FM
MEASUREMENT RANGE: ±40 kHz
HPF: 4 kHz
LPF: >20 kHz
DE EMPHASIS: OFF

(2) Check that the frequency counter (resolution : 0.1 Hz setting) reading is 32.768 kHz ± 1 Hz.

3-2-10. Battery Alarm Signal Check

Equipment and Tools

DC power supply
DC output Voltage: +3.0 ±0.1 V dc
DC ammeter
Frequency counter
Spectrum analyzer
Modulation analyzer
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)

Switch and Control Setting

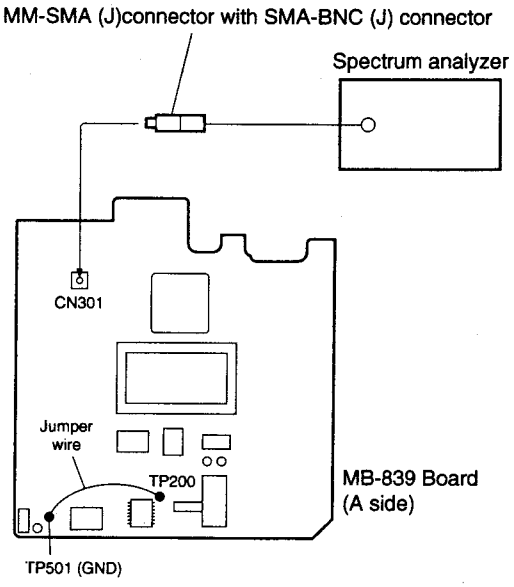
The following setting is to be perform with the SET switch (S402) , "+" switch (S400) and "−" switch(S401).

Transmitting Channel setting:
U64 model: 65-01 channel (776.125 MHz)
U66 model: 67-01 channel (788.125 MHz)
U68 model: 69-01 channel (800.125 MHz)
AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

1. Frequency deviation check

Connections

(For connecting the DC power supply, refer to the "Preparations" on page 3-2.)



Connect a jumper wire between TP200 and TP501 (GND) by soldering.
(TONE signal : OFF).

Procedure

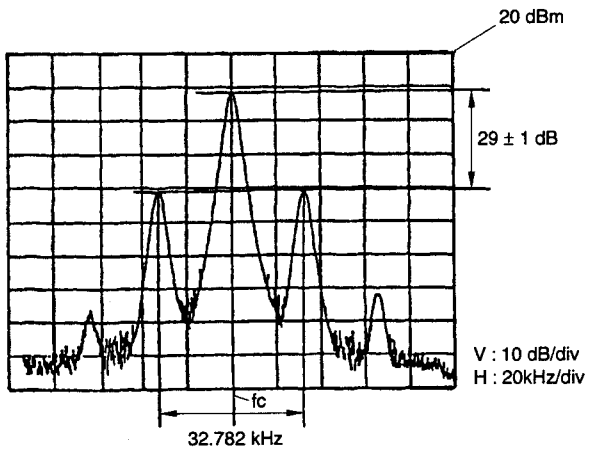
Note

Perform the checking with the MIC input connector short-circuited.

(1) Set the spectrum analyzer as follow:
CENTER FREQUENCY (fc):
U64 model: 776.125 MHz
U66 model: 788.125 MHz
U68 model: 800.125 MHz
AU66 model: 799.250 MHz
REFERENCE LEVEL: 20 dBm
FREQUENCY SPAN: 200 kHz (20 kHz/DIV)
RBW (resolution band width): 3 kHz
VBW (video band width): 1 kHz
ATT: 20 dB

(2) Decrease gradually the DC output voltage of the DC regulated power supply and confirm that the battery alarm signal turns on at 2 ±0.2 V.

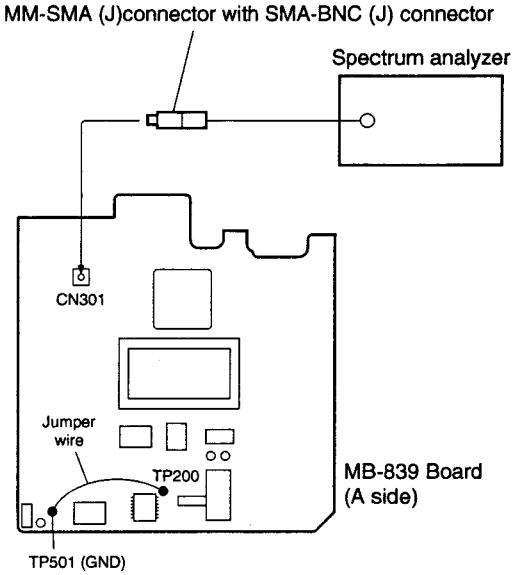
(3) Check that level difference between carrier frequency (center frequency level) on spectrum analyzer and tone signal is with in 29 ±1 dB.



2. Frequency check

Connections

(For connecting the DC power supply, refer to the "Preparations" on page 3-2.)



Connect a jumper wire between TP200 and TP501 (GND) by soldering. (TONE signal : OFF).

Procedure

Note

Perform the checking with the Mic input connector (SMC9-4P) short-circuited.

(1) Set the modulation analyzer as follows:
MEASUREMENT: FM
MEASUREMENT RANGE: ±40 kHz
HPF: 4 kHz
LPF: >20 kHz
DE EMPHASIS: OFF

(2) Set the DC output voltage of DC power supply to 1 ±0.1 V so that battery alarm signal goes on.

(3) Check that frequency counter (resolution:0.1 Hz) reading is 32.782 kHz ±1 Hz.

(4) After the checking, remove (unsolder) the jumper wire between TP200 and TP501 (GND) on the MB-839 board (A-side).

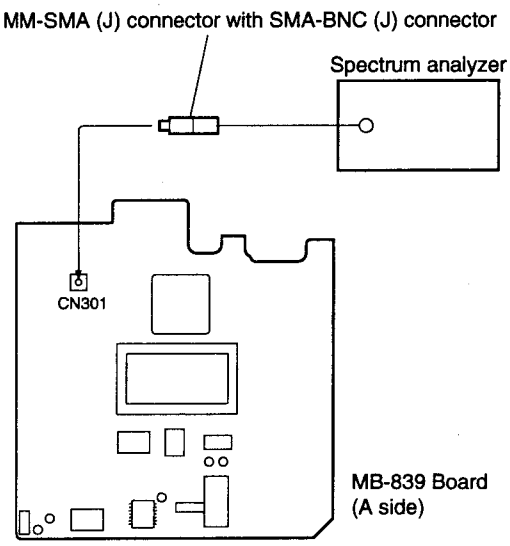
3-2-11. Spurious Emissions Check

Equipment and Tools

DC power supply
  DC output Voltage: +3.0 ±0.1 V dc
DC ammeter
Spectrum analyzer
MM-SMA (J) connector (Part No. J-6402-480-A)
SMA-BNC (J) connector (Part No. J-6402-490-A)

Connections

(For connecting the DC power supply, refer to the "Preparations" on page 3-2.)



Switch and Control Setting

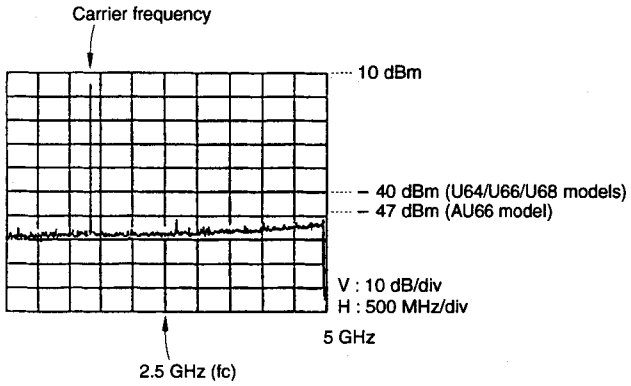
The following setting is to be perform with the SET switch (S402), "+" switch (S400) and "−" switch (S401).

Transmitting Channel setting:
  U64 model: 65-01 channel (776.125 MHz)
  U66 model: 67-01 channel (788.125 MHz)
  U68 model: 69-01 channel (800.125 MHz)
  AU66 model: 67-01 channel (799.250 MHz)
Attenuation setting: 0 dB
Accumulated time setting: "00:00"

Procedure

(1) Set the spectrum analyzer as follows;
  CENTER FREQUENCY: 2.5 GHz
  REFERENCE LEVEL: 10 dBm
  FREQUENCY SPAN: 5 GHz (500 MHz/DIV)
  or Full span
  RBW (resolution band width): 300 kHz
  ATT: 20 dB

(2) Check that the spurious emissions level (up to 4 GHz) reading for the spectrum analyzer remains below −40 dBm (For U64/U66/U68 models) / −47 dBm (AU66 model).

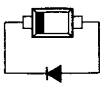


Section 4
Semiconductor Pin Assignments

Semiconductors of which functions are equivalent are described here. For parts replacement, refer to the section of Spare Parts in this manual. The circuit diagram of each IC is obtained from the IC data book published by the manufacturer.

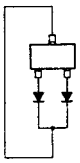
DIODE

—TOP VIEW—



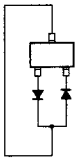
1SS367-T3 (SONY)

—TOP VIEW—



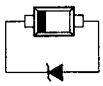
MA132WK
MA132WK-TX

—TOP VIEW—



MA133 (MATSUSHITA)
MA133-TX

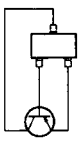
—TOP VIEW—



RD9.1SB
RD9.1SB-T1

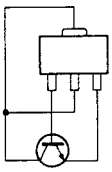
TRANSISTOR

—TOP VIEW—



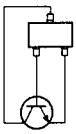
2SA1965-TL

—TOP VIEW—



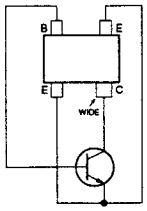
2SC3607-TE12L

—TOP VIEW—



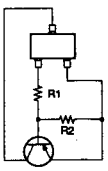
2SC4738-YGR-TE85L
2SC4919
2SC4919-TL
2SD2216-Q (TOSHIBA)

—TOP VIEW—



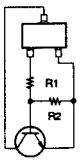
2SC5015-T1

—TOP VIEW—



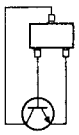
DTA144EE
(R1=47k, R2=47k)
DTA144EE-TL

—TOP VIEW—



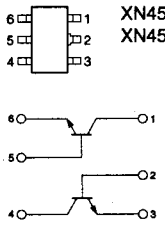
DTC114EE
(R1=10k, R2=10k)
DTC114EE-TL
UMZ8.2T
UMZ8.2T-T106

—TOP VIEW—



FMMT617TA

—TOP VIEW—



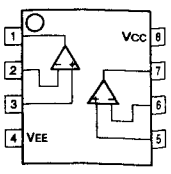
XN4504
XN4504-TX

IC

MC33077DR2 (MOTOROLA)

* DUAL OPERATIONAL AMPLIFIERS (DUAL-SUPPLY TYPE)

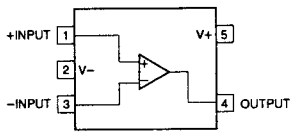
—TOP VIEW—



NJM2107F (JRC)
NJM2107F-TE2

SINGLE OPERATIONAL AMPLIFIER

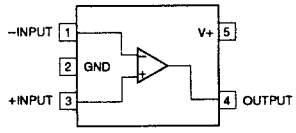
—TOP VIEW—



NJM2406F (JRC)
NJM2406F-TE2

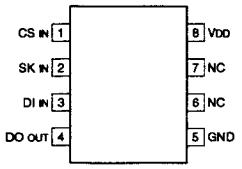
SINGLE COMPARATOR

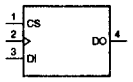
—TOP VIEW—



AK93C85AM-E2 (ASAHIKASEI)

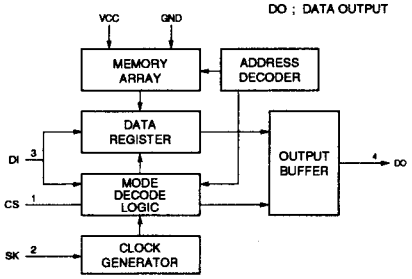
C-MOS 16,384-BIT SERIAL EEPROM
—TOP VIEW—





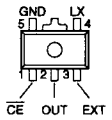
INPUT
CS ; CHIP SELECT
DI ; DATA INPUT
SK ; SERIAL CLOCK

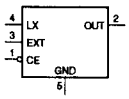
OUTPUT
DO ; DATA OUTPUT



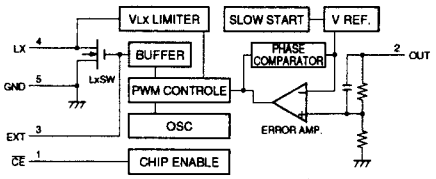
RH5RH503B-T1

C-MOS PWM STEP-UP DC/DC CONVERTER
—TOP VIEW—



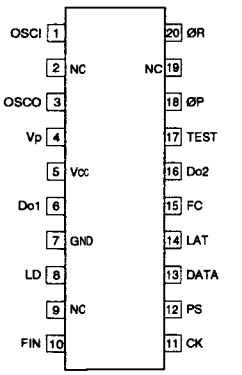


LX ; SWITCHING TERMINAL (OPEN DRAIN)
EXT ; EXTERNAL TRANSISTOR DRIVE (CMOS OUTPUT)
$\overline{CE}$; CHIP ENABLE
OUT ; STEP-UP OUTPUT VOLTAGE MONITOR

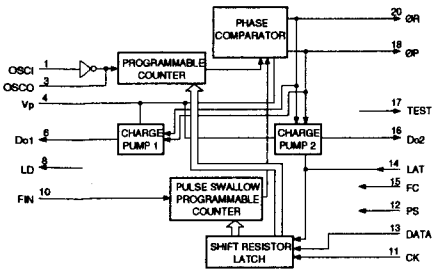


CXA1786N-T4 (SONY)

PLL FREQUENCY SYNTHESIZER (1.1 GHz BAND)
—TOP VIEW—

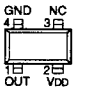


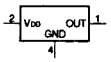
OSCI : REFERENCE FREQUENCY INPUT
OSCO : REFERENCE FREQUENCY OUTPUT
Vp : POWER SUPPLY FOR CHARGE PUMP, PHASE COMPARATOR
Do1 : CHARGE PUMP 1 OUTPUT
Do2 : CHARGE PUMP 2 OUTPUT
LD : LOCK DETECTION SIGNAL OUTPUT
ØP : PHASE COMPARATOR OUTPUT
ØR : PHASE COMPARATOR OUTPUT
CK : CLOCK INPUT
DATA : DATA INPUT
LAT : LATCH INPUT
PS : POWER SAVE INPUT ("L" : POWER SAVE MODE)
FC : SELECTION TERMINAL FOR PHASE OF PHASE COMPARATOR OUTPUT AND COUNTER OUTPUT SIGNAL TO TEST TERMINAL
TEST : OUTPUT FOR DIVIDING SIGNAL OF COUNTER

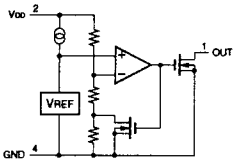


S-80820ANNP-EDH-T2 (SEIKO)

VOLTAGE DETECTOR
—TOP VIEW—

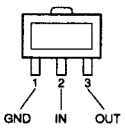






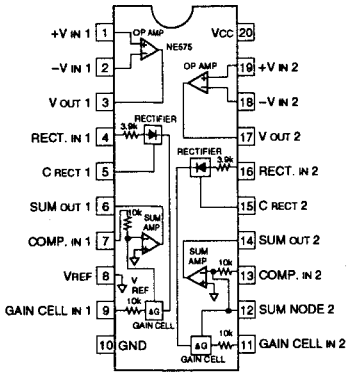
S-81233SGUP-DQF-T1 (SEIKO I&E)

POSITIVE VOLTAGE REGULATOR
—TOP VIEW—



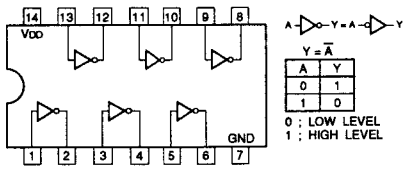
SA575DK-T (PHILIPS)

LOW VOLTAGE COMPANDOR
—TOP VIEW—



TC4069UBFT(EL,N) (TOSHIBA)

C-MOS INVERTER
—TOP VIEW—

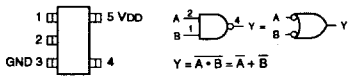


A	Y
0	1
1	0

0 : LOW LEVEL
1 : HIGH LEVEL

TC4S11F (TOSHIBA)
TC4S11F(TE85R)

C-MOS 2-INPUT NAND GATE
—TOP VIEW—

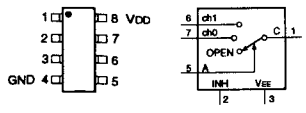


A	B	Y
0	0	1
0	1	1
1	0	1
1	1	0

0 : LOW LEVEL
1 : HIGH LEVEL

TC4W53FU (TOSHIBA)
TC4W53FU(TE12R)

C-MOS 2-CHANNEL MULTIPLEXER/DEMULTIPLEXER
—TOP VIEW—

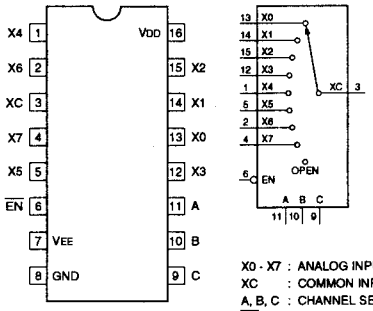


CONT. INPUT		ON CHANNEL
INH	A	
0	0	ch0
0	1	ch1
1	×	OPEN

0 : LOW LEVEL
1 : HIGH LEVEL
× : DON'T CARE

TC74HC4051AFT(EL) (TOSHIBA)

C-MOS 8-CHANNEL ANALOG MULTIPLEXER/DEMULTIPLEXER
—TOP VIEW—



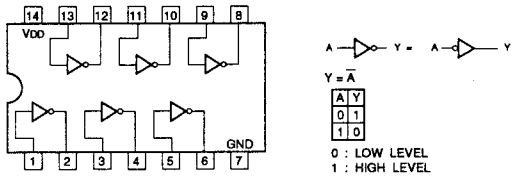
X0 - X7 : ANALOG INPUTS/OUTPUTS
XC : COMMON INPUT/OUTPUT
A, B, C : CHANNEL SELECT INPUT
EN : ENABLE INPUT

CONTROL INPUTS				SELECTED CHANNEL
EN	SELECT			
	C	B	A	
0	0	0	0	X0
0	0	0	1	X1
0	0	1	0	X2
0	0	1	1	X3
0	1	0	0	X4
0	1	0	1	X5
0	1	1	0	X6
0	1	1	1	X7
1	×	×	×	OPEN

0 : LOW LEVEL
1 : HIGH LEVEL
× : DON'T CARE

TC74VHCU04FT(EL) (TOSHIBA)

C-MOS HEX INVERTERS
—TOP VIEW—

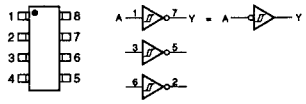


A	Y
0	1
1	0

0 : LOW LEVEL
1 : HIGH LEVEL

TC7W14FU(TE12R) (TOSHIBA)

C-MOS HEX INVERTERS
—TOP VIEW—



Y = $\overline{A}$

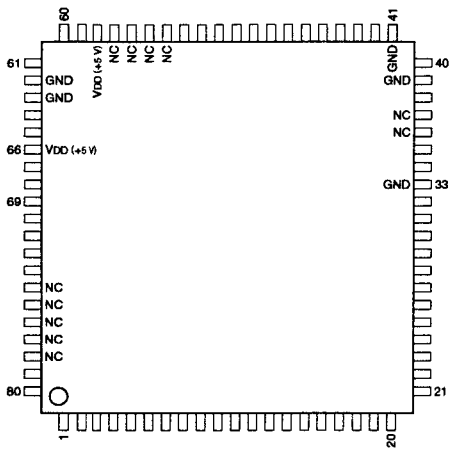
A	Y
0	1
1	0

0 : LOW LEVEL
1 : HIGH LEVEL

CPU PIN DESCRIPTION : IC402

UPD753036GK

—TOP VIEW—



PIN	SIGNAL	I/O	DESCRIPTION
1 to 20	S31 to S12	OUT	LCD segment control
21 to 24	COM0 to COM3	OUT	LCD common control
25	BIAS	OUT	Power supply for LCD drive (+5.0 V)
26 to 28	VLC0 to VLC2	IN	Power supply for LCD drive
29 to 31	ATT0 to ATT2	OUT	AF ATT control
32	ID	OUT	ID
33	VSS	—	Ground
34	AFM	OUT	AF muting
35	LVD	OUT	Battery alarm
36, 37	—	—	NC
38	RXD	IN	Received data
39	—	—	Ground
40	TEST	IN	Test
41	—	—	Ground
42	POFF–IN	IN	Power off
43	+	IN	Channel switch +
44	–	IN	Channel switch –
45	SET	IN	SET switch
46	CLK	OUT	EEPROM/PLL Clock
47	DI	OUT	EEPROM/PLL data out
48	CS	OUT	EEPROM chip select
49	LAT	OUT	PLL latch

PIN	SIGNAL	I/O	DESCRIPTION
50	POFF–OUT	OUT	Power off
51	REM	OUT	RF muting
52	DO	IN	EEPROM data in
53	LD	IN	PLL lock
54 to 57	—	—	NC
58	BAT1	IN	VDD (+5.0 V)
59	BAT0	IN	Battery voltage
60	DEST	IN	Selection for destination
61	ALO	IN	AF level
62, 63	—	—	Ground
64	AVSS	—	Ground
65	AVREF	IN	A/D convertor reference voltage
66	VDD	—	VDD (+5.0 V)
67, 68	XT1, XT2	IN	32.768 kHz
69	IC	IN	VDD (+5.0 V)
70, 71	X1, X2	IN	4 MHz clock
72	RESET	IN	Reset
73	SEL	IN	VSS (Ground)
74 to 78	—	—	NC
79	TXD	OUT	Transmitted data
80	SLP	OUT	SLP

Section 5
Spare Parts

5-1. Notes on Repair Parts

(1) Safety Related Components Warning
Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

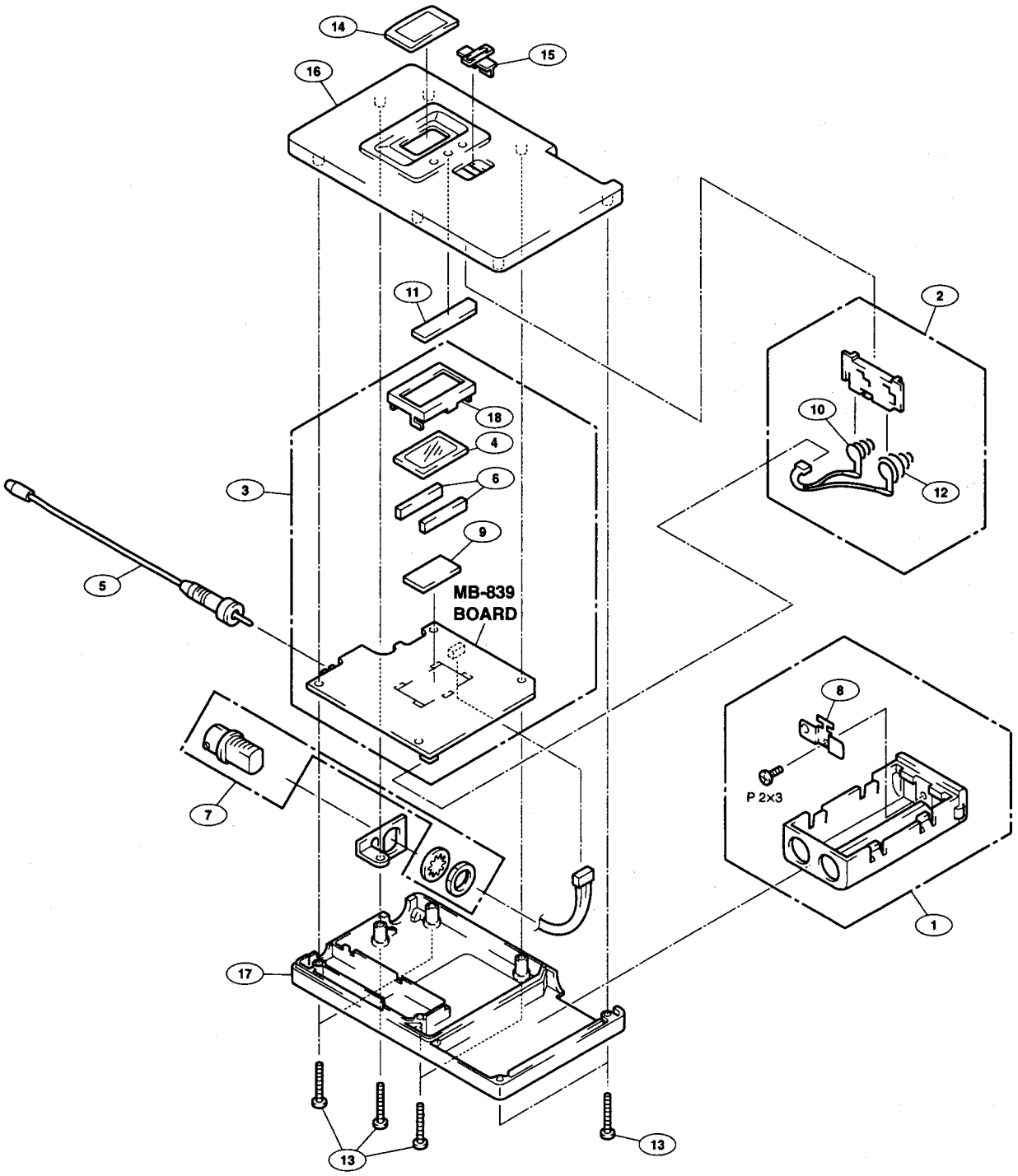
(2) Standardization of Parts
Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".
This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

(3) Stock of Parts
Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

(4) Units for Capacitors, Inductors and Resistors
The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

Capacitors : μF
Inductors : μH
Resistors : Ω

5-2. Exploded Views



No.	Part No.	SP	Description
1	A-4521-033-D	s	CASE ASSY, BATTERY
2	A-8321-988-A	s	TERMINAL ASSY, BATTERY
3	A-8322-984-A	o	MOUNTED BOARD BLOCK ASSY (for U68 model)
	A-8322-989-A	o	MOUNTED BOARD BLOCK ASSY (for U64 model)
	A-8322-993-A	o	MOUNTED BOARD BLOCK ASSY (for U66 model)
	A-8322-997-A	o	MOUNTED BOARD BLOCK ASSY (for AU66 model)
4	1-467-301-11	s	DISPLAY, LIQUID CRYSTAL
5	1-501-458-12	s	ANTENNA
6	1-537-802-11	o	CONDUCTIVE BOARD,CONNECTION
7	1-561-376-11	s	CONNECTOR (S) 4P
8	2-540-502-04	o	TERMINAL BOARD
9	2-545-242-01	o	PLATE, LCD
10	2-545-692-01	s	SPRING (HOT), BATTERY
11	2-545-693-01	o	SHEET (SW)
12	2-545-694-01	s	SPRING (GND),BATTERY
13	2-545-695-01	s	B TITE 2x12
14	3-202-103-01	o	PANEL (LCD)
15	3-202-108-02	o	KNOB (P)
16	3-202-109-01	o	CASE (UP)
17	3-202-110-01	o	CASE (DOWN)
18	3-678-343-01	s	CASE (LCD)

5-3. Electrical Parts List

MB-839 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8322-984-A	o	PC BOARD BLOCK ASSY (for U68 model)
1pc	A-8322-989-A	o	PC BOARD BLOCK ASSY (for U64 model)
1pc	A-8322-993-A	o	PC BOARD BLOCK ASSY (for U66 model)
1pc	A-8322-997-A	o	PC BOARD BLOCK ASSY (for AU66 model)
1pc	1-467-301-11	s	DISPLAY, LIQUID CRYSTAL
2pcs	1-537-802-11	o	CONDUCTIVE BOARD, CONNECTION
1pc	2-545-242-01	o	PLATE, LCD
1pc	3-678-343-01	s	CASE(LCD)
C100	1-104-852-11	s	CAPACITOR,TANTALUM 22MF/10V
C101	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C102	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C103	1-104-852-11	s	CAPACITOR,TANTALUM 22MF/10V
C104	1-135-179-21	s	CAPACITOR,TANTALUM 2.2MF/16V
C105	1-104-852-11	s	CAPACITOR,TANTALUM 22MF/10V
C106	1-113-642-11	s	CAPACITOR, TANTALUM 47MF/10V
C107	1-164-938-11	s	CAPACITOR CERAMIC 1500PF/16VB
C108	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C110	1-135-179-21	s	CAPACITOR,TANTALUM 2.2MF/16V
C111	1-135-179-21	s	CAPACITOR,TANTALUM 2.2MF/16V
C112	1-119-923-11	s	CAPACITOR,CHIP CERAMIC 0.047MF
C113	1-164-882-11	s	CAPACITOR CERAMIC 220PF/16VCH
C114	1-107-688-21	s	CAPACITOR,TANTALUM 1.5MF/25V
C115	1-135-179-21	s	CAPACITOR,TANTALUM 2.2MF/16V
C116	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C117	1-119-923-11	s	CAPACITOR,CHIP CERAMIC 0.047MF
C118	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C119	1-135-179-21	s	CAPACITOR,TANTALUM 2.2MF/16V
C120	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C121	1-117-614-11	s	CAPACITOR,CERAMIC8200PF B 1005
C122	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C123	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C124	1-164-882-11	s	CAPACITOR CERAMIC 220PF/16VCH
C125	1-113-500-11	s	CAPACITOR TANTALUM 100MF/10V
C126	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C127	1-104-915-11	s	CAPACITOR,CHIP 2.2MF/20V
C129	1-135-179-21	s	CAPACITOR,TANTALUM 2.2MF/16V
C131	1-115-156-11	s	CAPACITOR, 1MF/10V (1608)
C132	1-115-156-11	s	CAPACITOR, 1MF/10V (1608)
C133	1-115-156-11	s	CAPACITOR, 1MF/10V (1608)
C134	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C135	1-164-938-11	s	CAPACITOR CERAMIC 1500PF/16VB
C136	1-164-850-11	s	CAPACITOR CERAMIC 10PF/16V CH
C137	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C138	1-164-941-11	s	CAPACITOR CHIP CERAMIC 4700PF (for AU66 model)
C139	1-164-941-11	s	CAPACITOR CHIP CERAMIC 4700PF (for AU66 model)
C142	1-119-923-11	s	CAPACITOR,CHIP CERAMIC 0.047MF
C143	1-125-777-11	s	CAPACITOR CERAMIC 0.1MF/10V
C144	1-107-819-11	s	CAP CERAMIC 22000PF/16V(1005)
C145	1-110-563-11	s	CAPACITOR CERAMIC 0.068MF/16V
C200	1-113-642-11	s	CAPACITOR, TANTALUM 47MF/10V
C201	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C202	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C203	1-164-858-11	s	CAPACITOR,CERAMIC 22PF/161005
C204	1-164-858-11	s	CAPACITOR,CERAMIC 22PF/161005

(MB-839 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C209	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C210	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C211	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C213	1-135-179-21	s	CAPACITOR,TANTALUM 2.2MF/16V
C214	1-164-934-11	s	CAPACITOR CERAMIC 330PF/16V(B)
C215	1-164-939-11	s	CAPACITOR,CHIPCERAMIC 2200PF
C216	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C218	1-164-858-11	s	CAPACITOR,CERAMIC 22PF/161005
C219	1-164-858-11	s	CAPACITOR,CERAMIC 22PF/161005
C230	1-164-939-11	s	CAPACITOR,CHIPCERAMIC 2200PF
C231	1-164-934-11	s	CAPACITOR CERAMIC 330PF/16V(B)
C232	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C233	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C234	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C235	1-164-936-11	s	CAPACITOR,CHIP CERAMIC 680PF
C236	1-164-880-11	s	CAPACITOR,CHIP CERAMIC 180PF
C237	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C238	1-162-977-11	s	CAPACITOR,CERAMIC 1800P/50V(B)
C300	1-113-642-11	s	CAPACITOR, TANTALUM 47MF/10V
C301	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C302	1-113-642-11	s	CAPACITOR, TANTALUM 47MF/10V
C303	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C304	1-119-923-11	s	CAPACITOR,CHIP CERAMIC 0.047MF
C305	1-164-843-11	s	CAPACITOR CHIP CERAMIC 3PF/16V
C307	1-135-210-11	s	CAPACITOR TANTAL 4.7MF/10V
C308	1-104-919-11	s	CAPASITOR TANTALLUM 10MF/25V
C309	1-119-923-11	s	CAPACITOR,CHIP CERAMIC 0.047MF
C310	1-119-923-11	s	CAPACITOR,CHIP CERAMIC 0.047MF
C311	1-117-887-11	s	CAPACITOR,TANTALUM 220MF/6.3V
C312	1-164-874-11	s	CAPACITOR,CHIP CERAMIC 100PF
C313	1-113-642-11	s	CAPACITOR, TANTALUM 47MF/10V
C314	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C316	1-135-210-11	s	CAPACITOR TANTAL 4.7MF/10V
C317	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C318	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C320	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C321	1-164-858-11	s	CAPACITOR,CERAMIC 22PF/161005
C322	1-162-906-11	s	CAPACITOR,CERAMIC 1.5PF/50V 1608 (for U68, AU66 models)
	1-162-908-11	s	CAPACITOR,CERAMIC 3PF/50V 1608 (for U64,U66 models)
C323	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C324	1-162-908-11	s	CAPACITOR,CERAMIC 3PF/50V 1608 (for U64 model)
	1-162-912-11	s	CAPACITOR,CERAMIC 7PF/50V 1608 (for U66 model)
	1-162-914-11	s	CAPACITOR,CERAMIC 9PF/50V 1608 (for U68,AU66 models)
C325	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C326	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C327	1-162-908-11	s	CAPACITOR,CERAMIC 3PF/50V 1608 (for U66,U68,AU66 models)
	1-162-909-11	s	CAPACITOR,CERAMIC 4.0PF/50V CH (for U64 model)
C328	1-113-642-11	s	CAPACITOR, TANTALUM 47MF/10V
C329	1-162-906-11	s	CAPACITOR,CERAMIC 1.5PF/50V 1608 (for U68 model)
	1-162-907-11	s	CAPACITOR,CERAMIC 2PF/50V 1608 (for U66 model)
	1-162-908-11	s	CAPACITOR,CERAMIC 3PF/50V 1608 (for U64,AU66 models)

(MB-839 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C331	1-162-908-11	s	CAPACITOR,CERAMIC 3PF/50V 1608 (for U68,AU66 models)
	1-162-910-11	s	CAPACITOR,CERAMIC 5PF/50V 1608 (for U66 model)
	1-162-911-11	s	CAPACITOR,CERAMIC 6PF/50V 1608 (for U64 model)
C400	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C401	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C402	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C403	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C404	1-164-868-11	s	CAPACITOR,CHIP CERAMIC 56PF
C405	1-164-845-11	s	CAPACITOR,CERAMIC 5PF/16V(1005
C406	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C407	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C408	1-135-179-21	s	CAPACITOR,TANTALUM 2.2MF/16V
C409	1-125-777-11	s	CAPACITOR CERAMIC 0.1MF/10V
C410	1-104-852-11	s	CAPACITOR,TANTALUM 22MF/10V
C411	1-119-923-11	s	CAPACITOR,CHIP CERAMIC 0.047MF
C412	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C413	1-119-923-11	s	CAPACITOR,CHIP CERAMIC 0.047MF
C414	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C415	1-119-923-11	s	CAPACITOR,CHIP CERAMIC 0.047MF
C416	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C417	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C418	1-164-937-11	s	CAPACITOR CHIP CERAMIC 1000PF
C500	1-117-887-11	s	CAPACITOR,TANTALUM 220MF/6.3V
C501	1-117-887-11	s	CAPACITOR,TANTALUM 220MF/6.3V
C502	1-115-170-11	s	CAPACITOR,TANTAL(SMD)4.7MF/10V
C503	1-162-977-11	s	CAPACITOR,CERAMIC 1800P/50V(B)
C504	1-125-777-11	s	CAPACITOR CERAMIC 0.1MF/10V
C505	1-164-866-11	s	CAPACITOR,CHIP CERAMIC 47PF/16
C506	1-117-372-11	s	CAP,ELECT (SMD) 100MF/10V
C507	1-104-852-11	s	CAPACITOR,TANTALUM 22MF/10V
C508	1-115-170-11	s	CAPACITOR,TANTAL(SMD)4.7MF/10V
C516	1-104-851-11	s	CAPACITOR,TANTALUM 10MF/10V
C517	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C518	1-164-943-11	s	CAPACITOR CHIP CERAMIC 0.01MF
C519	1-125-777-11	s	CAPACITOR CERAMIC 0.1MF/10V
C520	1-125-777-11	s	CAPACITOR CERAMIC 0.1MF/10V
C521	1-125-777-11	s	CAPACITOR CERAMIC 0.1MF/10V
CN102	1-779-884-11	s	PLUG, CONNECTOR 4P
CN300	1-750-004-11	o	SOCKET, SIL 2P
CN301	1-774-915-11	s	CONNECTOR, COAXIAL
CN400	1-770-623-21	s	PIN, CONNECTOR 6P
CN501	1-770-619-11	o	PIN, CONNECTOR 2P
CP300	1-760-668-21	s	OSCILLATOR (VOLTAGE VAR TYPE) (for U68,AU66 models)
	1-760-948-21	s	OSCILLATOR (VOLTAGE VAR TYPE) (for U64 model)
	1-781-516-21	s	OSCILLATOR (VOLTAGE VAR TYPE) (for U66 model)
CP301	1-251-235-11	s	ISOLATOR (RF) (for U68,AU66 models)
	1-759-204-21	s	ISOLATOR (for U64,U66 models)
CS300	1-251-820-11	s	COUPLING DIRECTION
CT400	1-141-322-11	s	CAPACITOR,VAR,TRIMMER
D100	8-719-039-99	s	DIODE UMZ8.2T
D104	8-719-421-69	s	DIODE MA133

(MB-839 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
D105	8-719-421-69	s	DIODE MA133
D106	8-719-421-69	s	DIODE MA133 (for AU66 model)
D107	8-719-421-69	s	DIODE MA133 (for AU66 model)
D108	8-719-049-09	s	DIODE 1SS367-T3SONY
D300	8-719-158-35	s	DIODE RD9.1SB (ZENER)
D301	8-719-421-69	s	DIODE MA133
D302	8-719-421-67	s	DIODE MA132WK
D400	8-719-421-69	s	DIODE MA133
D401	8-719-421-67	s	DIODE MA132WK
D402	8-719-039-99	s	DIODE UMZ8.2T
D403	8-719-039-99	s	DIODE UMZ8.2T
D404	8-719-049-09	s	DIODE 1SS367-T3SONY
D500	8-719-049-09	s	DIODE 1SS367-T3SONY
D502	8-719-039-99	s	DIODE UMZ8.2T
D503	8-719-039-99	s	DIODE UMZ8.2T
D505	8-719-049-09	s	DIODE 1SS367-T3SONY
F100	1-233-322-11	s	FILTER, CHIP EMI
F101	1-233-322-11	s	FILTER, CHIP EMI
F102	1-234-275-11	s	FILTER, LOW PASS
F103	1-233-322-11	s	FILTER, CHIP EMI
F500	1-233-322-11	s	FILTER, CHIP EMI
FL300	1-233-939-11	s	FILTER, LOW PASS (SMD TYPE)
IC100	8-759-523-00	s	IC TC74HC4051AFT(EL)
IC101	8-759-466-68	s	IC MC33077D (R2)
IC102	8-759-710-79	s	IC NJM2107F
IC104	8-759-539-60	s	IC SA575DK-T
IC105	8-759-710-82	s	IC NJM2406F
IC200	8-759-530-29	s	IC TC4069UBFT (EL,N)
IC201	8-759-209-69	s	IC TC4S11F
IC202	8-759-082-61	s	IC TC4W53FU
IC203	8-759-466-68	s	IC MC33077D (R2)
IC230	8-759-466-68	s	IC MC33077D (R2)
IC300	8-752-069-39	s	IC CXA1786N
IC400	8-759-530-30	s	IC TC74VHCU04FT (EL)
IC402	8-759-637-95		IC UPD75P3036GK-T822-V1.1
IC404	8-759-466-71	s	IC S-80820ANNP-EDH-T2
IC405	8-759-465-76	s	IC AK93C85AM-E2
IC406	8-759-277-63	s	IC TC7W14FU (TE12R)
IC500	8-759-466-67	s	IC RH5RH503B-T1
IC501	8-759-493-53	s	IC S-81233SGUP-DQF-T1
L301	1-410-658-31	s	INDUCTOR,CHIP 220UH (3225)
L302	1-414-461-31	s	INDUCTOR, CHIP (K) 6.8NH (for U66 model)
	1-414-462-31	s	INDUCTOR, CHIP (K) 8.2NH (for U64 model)
	1-414-463-41	s	INDUCTOR, CHIP (J) 10NH (for U68,AU66 models)
L303	1-414-461-31	s	INDUCTOR, CHIP (K) 6.8NH
L304	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH
L305	1-414-465-31	s	INDUCTOR, CHIP (J) 15NH
L306	1-410-658-31	s	INDUCTOR,CHIP 220UH (3225)
L307	1-414-462-31	s	INDUCTOR, CHIP (K) 8.2NH
L400	1-414-394-11	s	INDUCTOR (SMD) 2.2UH
L401	1-414-394-11	s	INDUCTOR (SMD) 2.2UH
L500	1-414-398-11	s	INDUCTOR (SMD) 10UH
Q101	8-729-928-27	s	TRANSISTOR DTA144EE

(MB-839 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
Q102	8-729-015-66	s	TRANSISTOR 2SC4919 (for AU66 model)
Q103	8-729-031-69	s	TRANSISTOR 2SA1965-TL (for AU66 model)
Q104	8-729-015-66	s	TRANSISTOR 2SC4919 (for AU66 model)
Q200	8-729-425-64	s	TRANSISTOR 2SD2216Q
Q201	8-729-015-66	s	TRANSISTOR 2SC4919
Q230	8-729-031-69	s	TRANSISTOR 2SA1965-TL
Q300	8-729-425-64	s	TRANSISTOR 2SD2216Q
Q301	8-729-031-69	s	TRANSISTOR 2SA1965-TL
Q302	8-729-031-69	s	TRANSISTOR 2SA1965-TL
Q303	8-729-039-32	s	TRANSISTOR 2SC5015-T1
Q304	8-729-231-69	s	TRANSISTOR 2SC3607-TE12L
Q400	8-729-928-90	s	TRANSISTOR DTC114EE
Q500	8-729-041-51	s	TRANSISTOR FMMT617TA
Q501	8-729-031-69	s	TRANSISTOR 2SA1965-TL
Q502	8-729-425-18	s	TRANSISTOR XN4504
Q503	8-729-928-90	s	TRANSISTOR DTC114EE
Q508	8-729-031-69	s	TRANSISTOR 2SA1965-TL
Q509	8-729-928-90	s	TRANSISTOR DTC114EE
Q510	8-729-425-64	s	TRANSISTOR 2SD2216Q
R100	1-208-671-11	s	RESISTOR CHIP 330 1/16W (1005)
R101	1-208-715-11	s	RESISTOR CHIP 22K 1/16W (1005)
R104	1-218-849-11	s	RESISTOR,CHIP 1.2K 1/16W(1608)
R105	1-218-958-11	s	RESISTOR,CHIP 2.7K 1/16W(1005)
R106	1-208-689-11	s	RESISTOR CHIP 1.8K 1/16W(1005)
R107	1-208-687-11	s	RESISTOR CHIP 1.5K 1/16W(1005)
R108	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R109	1-208-679-11	s	RESISTOR CHIP 680 1/16W (1005)
R110	1-208-675-11	s	RESISTOR CHIP 470 1/16W (1005)
R111	1-218-849-11	s	RESISTOR,CHIP 1.2K 1/16W(1608)
R112	1-208-935-11	s	RESISTOR CHIP 82K
R113	1-208-935-11	s	RESISTOR CHIP 82K
R114	1-208-935-11	s	RESISTOR CHIP 82K
R115	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R116	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R117	1-208-935-11	s	RESISTOR CHIP 82K
R118	1-208-935-11	s	RESISTOR CHIP 82K
R119	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R120	1-208-894-11	s	RESISTOR,CHIP 2.0K 1/16W(1005)
R123	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R125	1-208-698-11	s	RESISTOR CHIP 4.4H 1/16W(1005)
R126	1-218-849-11	s	RESISTOR,CHIP 1.2K 1/16W(1608)
R127	1-208-955-11	s	RESISTOR CHIP 680K
R128	1-208-701-11	s	RESISTOR CHIP 5.6K 1/16W(1005)
R129	1-208-935-11	s	RESISTOR CHIP 82K
R130	1-218-849-11	s	RESISTOR,CHIP 1.2K 1/16W(1608)
R131	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R132	1-208-701-11	s	RESISTOR CHIP 5.6K 1/16W(1005)
R133	1-208-703-11	s	RESISTOR CHIP 6.8K 1/16W(1005)
R134	1-208-885-11	s	RESISTOR, CHIP 820 1/16W(1005)
R135	1-208-719-11	s	RESISTOR CHIP 33K 1/16W (1005)
R136	1-208-719-11	s	RESISTOR CHIP 33K 1/16W (1005)
R137	1-218-989-11	s	RESISTOR CHIP 1M 1/16W (1005)
R138	1-208-713-11	s	RESISTOR CHIP 18K 1/16W (1005)
R139	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R140	1-208-935-11	s	RESISTOR CHIP 82K
R141	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)

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Ref. No. or Q'ty	Part No.	SP	Description
R142	1-208-935-11	s	RESISTOR CHIP 82K
R143	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R144	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R145	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R146	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R147	1-218-982-11	s	RESISTOR CHIP 270K 1/16W(1005)
R157	1-216-864-11	s	RESISTOR,CHIP 0 1/16W (1608)
R158	1-218-941-11	s	RESISTOR CHIP 100 1/16W (1005)
R200	1-219-570-11	s	RESISTOR,CHIP 10M 1/16W
R201	1-218-985-11	s	RESISTOR CHIP 470K 1/16W(1005)
R202	1-208-935-11	s	RESISTOR CHIP 82K
R206	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R207	1-208-935-11	s	RESISTOR CHIP 82K
R208	1-208-719-11	s	RESISTOR CHIP 33K 1/16W (1005)
R209	1-208-719-11	s	RESISTOR CHIP 33K 1/16W (1005)
R210	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R211	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R212	1-208-935-11	s	RESISTOR CHIP 82K
R213	1-208-935-11	s	RESISTOR CHIP 82K
R214	1-208-935-11	s	RESISTOR CHIP 82K
R215	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R216	1-208-691-11	s	RESISTOR CHIP 2.2K 1/16W(1005)
R217	1-208-701-11	s	RESISTOR CHIP 5.6K 1/16W(1005)
R218	1-208-701-11	s	RESISTOR CHIP 5.6K 1/16W(1005)
R219	1-208-935-11	s	RESISTOR CHIP 82K
R220	1-208-939-11	s	RESISTOR, CHIP 150K (1005)
R221	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R222	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R223	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R224	1-218-985-11	s	RESISTOR CHIP 470K 1/16W(1005)
R225	1-219-570-11	s	RESISTOR,CHIP 10M 1/16W
R226	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R230	1-208-701-11	s	RESISTOR CHIP 5.6K 1/16W(1005)
R231	1-208-701-11	s	RESISTOR CHIP 5.6K 1/16W(1005)
R232	1-208-691-11	s	RESISTOR CHIP 2.2K 1/16W(1005)
R233	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R234	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R235	1-208-935-11	s	RESISTOR CHIP 82K
R236	1-208-711-11	s	RESISTOR CHIP 15K 1/16W (1005)
R237	1-208-711-11	s	RESISTOR CHIP 15K 1/16W (1005)
R238	1-218-958-11	s	RESISTOR,CHIP 2.7K 1/16W(1005)
R240	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R300	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R301	1-208-715-11	s	RESISTOR CHIP 22K 1/16W (1005)
R302	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R303	1-208-935-11	s	RESISTOR CHIP 82K
R304	1-216-841-11	s	RESISTOR, CHIP 47K 1/16W 1608
R305	1-208-675-11	s	RESISTOR CHIP 470 1/16W (1005)
R306	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R307	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R308	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R309	1-208-691-11	s	RESISTOR CHIP 2.2K 1/16W(1005)
R310	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R311	1-208-935-11	s	RESISTOR CHIP 82K
R312	1-208-647-11	s	RESISTOR CHIP 33 1/16W (1005)
R313	1-208-713-11	s	RESISTOR CHIP 18K 1/16W (1005)
R314	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R315	1-218-990-11	s	RESISTOR CHIP 0 1/16W (1005)
R316	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)

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Ref. No. or Q'ty	Part No.	SP	Description
R317	1-216-809-11	s	RESISTOR,CHIP 100 1/16W 1608
R318	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R329	1-208-652-11	s	RESISTOR CHIP 51 1/16W (1005)
R400	1-216-825-11	s	RESISTOR,CHIP 2.2K 1/16W 1608 (for U64 model)
	1-216-827-11	s	RESISTOR,CHIP 3.3K 1/16W 1608 (for U66,U68 models)
	1-218-345-11	s	RESISTOR,CHIP 9.1K 1/16W(1608) (for AU66 model)
R401	1-216-827-11	s	RESISTOR,CHIP 3.3K 1/16W(1608) (for AU66 model)
	1-216-831-11	s	RESISTOR,CHIP 6.8K 1/16W(1608) (for U68 model)
	1-218-345-11	s	RESISTOR,CHIP 9.1K 1/16W(1608) (for U64,U66 models)
R402	1-218-941-11	s	RESISTOR CHIP 100 1/16W (1005)
R403	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R404	1-218-989-11	s	RESISTOR CHIP 1M 1/16W (1005)
R405	1-208-689-11	s	RESISTOR CHIP 1.8K 1/16W(1005)
R406	1-208-935-11	s	RESISTOR CHIP 82K
R407	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R408	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R410	1-208-935-11	s	RESISTOR CHIP 82K
R411	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R412	1-208-935-11	s	RESISTOR CHIP 82K
R413	1-208-715-11	s	RESISTOR CHIP 22K 1/16W (1005)
R414	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R415	1-208-715-11	s	RESISTOR CHIP 22K 1/16W (1005)
R416	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R417	1-208-935-11	s	RESISTOR CHIP 82K
R418	1-208-715-11	s	RESISTOR CHIP 22K 1/16W (1005)
R419	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R420	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R421	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R422	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R423	1-208-935-11	s	RESISTOR CHIP 82K
R424	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R425	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R426	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R427	1-208-935-11	s	RESISTOR CHIP 82K
R430	1-208-935-11	s	RESISTOR CHIP 82K
R500	1-208-935-11	s	RESISTOR CHIP 82K
R501	1-218-941-11	s	RESISTOR CHIP 100 1/16W (1005)
R502	1-208-687-11	s	RESISTOR CHIP 1.5K 1/16W (1005
R503	1-208-635-11	s	RESISTOR CHIP 10 1/16W (1005)
R504	1-218-958-11	s	RESISTOR,CHIP 2.7K 1/16W(1005)
R505	1-208-927-11	s	RESISTOR, CHIP 47K (1005)
R506	1-208-683-11	s	RESISTOR CHIP 1K 1/16W (1005)
R514	1-218-941-11	s	RESISTOR CHIP 100 1/16W (1005)
R515	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R516	1-208-935-11	s	RESISTOR CHIP 82K
R517	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R518	1-208-935-11	s	RESISTOR CHIP 82K
R520	1-208-707-11	s	RESISTOR CHIP 10K 1/16W (1005)
R521	1-208-699-11	s	RESISTOR CHIP 4.7K 1/16W(1005)
R522	1-208-715-11	s	RESISTOR CHIP 22K 1/16W (1005)
RV101	1-223-348-11	s	RES, ADJ, CERMET 22K
RV201	1-223-348-11	s	RES, ADJ, CERMET 22K
RV202	1-223-349-11	s	RESISTOR,ADJ,CERMET 47K
RV300	1-223-348-11	s	RES, ADJ, CERMET 22K

(MB-839 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
S400	1-762-526-11	s	SWITCH
S401	1-762-526-11	s	SWITCH
S402	1-762-526-11	s	SWITCH
S500	1-771-667-11	s	SWITCH, SLIDE
T100	1-423-265-21	s	TRANSFORMER,INPUT
T500	1-433-795-11	s	TRANSFORMER, DC-DC CONVETER
X200	1-767-100-11	s	VIBRATOR, CRYSTAL
X201	1-760-252-12	s	VIBRATOR, CRYSTAL
X400	1-760-474-11	s	VIBRATOR, CRYSTAL

5-4. Supplied Accessories

Ref. No. or Q'ty	Part No.	SP	Description
1pc	2-540-964-01	s	CASE, SOFT
1pc	3-866-667-11	s	MANUAL, INSTRUCTION (for U64,U66,U68 models)
1pc	3-866-667-31	s	MANUAL, INSTRUCTION (for AU66 model)

Section 6
Block Diagram

Description

WRT-822A is comprised of the following:

MB-839 board

Audio and peripheral circuit block; Ref. No. 100s and 200s
PLL and RF circuit block; Ref. No. 300s
CPU and peripheral circuit block; Ref. No. 400s
Power supply circuit block; Ref. No. 500s

Audio and peripheral circuit block

The audio signal which is input from the MIC input connector (CN100) is input into the transformer (T100) as an balance signal.
The audio signal which is outputted from the transformer (T100) is input into the Audio attenuator (ATT) circuit (IC100).
The ATT can be set between 0 to 21 dB in 3 dB steps by switching the resistance value using analog switch (IC100).
The control signal for the analog switch is the 3 bits (ATT0, ATT1, ATT2) signal that has been sent from the CPU (IC402).
This signal is set by the information on + or − switches (S400 and S401) input to the CPU.
The audio signal which is adjusted the volume by the ATT circuit is amplified by IC101(1/2), then input into the compressor circuit (IC104) via the low-pass filter (F102) and buffer amplifier (IC203-1/2).
The audio signal is compressed to a signal level of 2:1 (1/2) by the compressor circuit and then inputs into the pre-emphasis circuit. Note that time constant for the pre-emphasis is 50 μs.
The audio signal is mixed with the tone signal (X201, 32.768 kHz) and battery alarm signal (X200, 32.782 kHz) and is sent RF circuit block (VCO,CP300) via the AF switch (IC202) and AF filter (IC230).
The A/D converter circuit (IC102, D104, D400) detects the audio signal and converts into DC level voltage. The converted signal (ALO signal) is sent to the CPU and is used to indicate the input audio signal level on the LCD (ND400).

PLL and RF circuit block

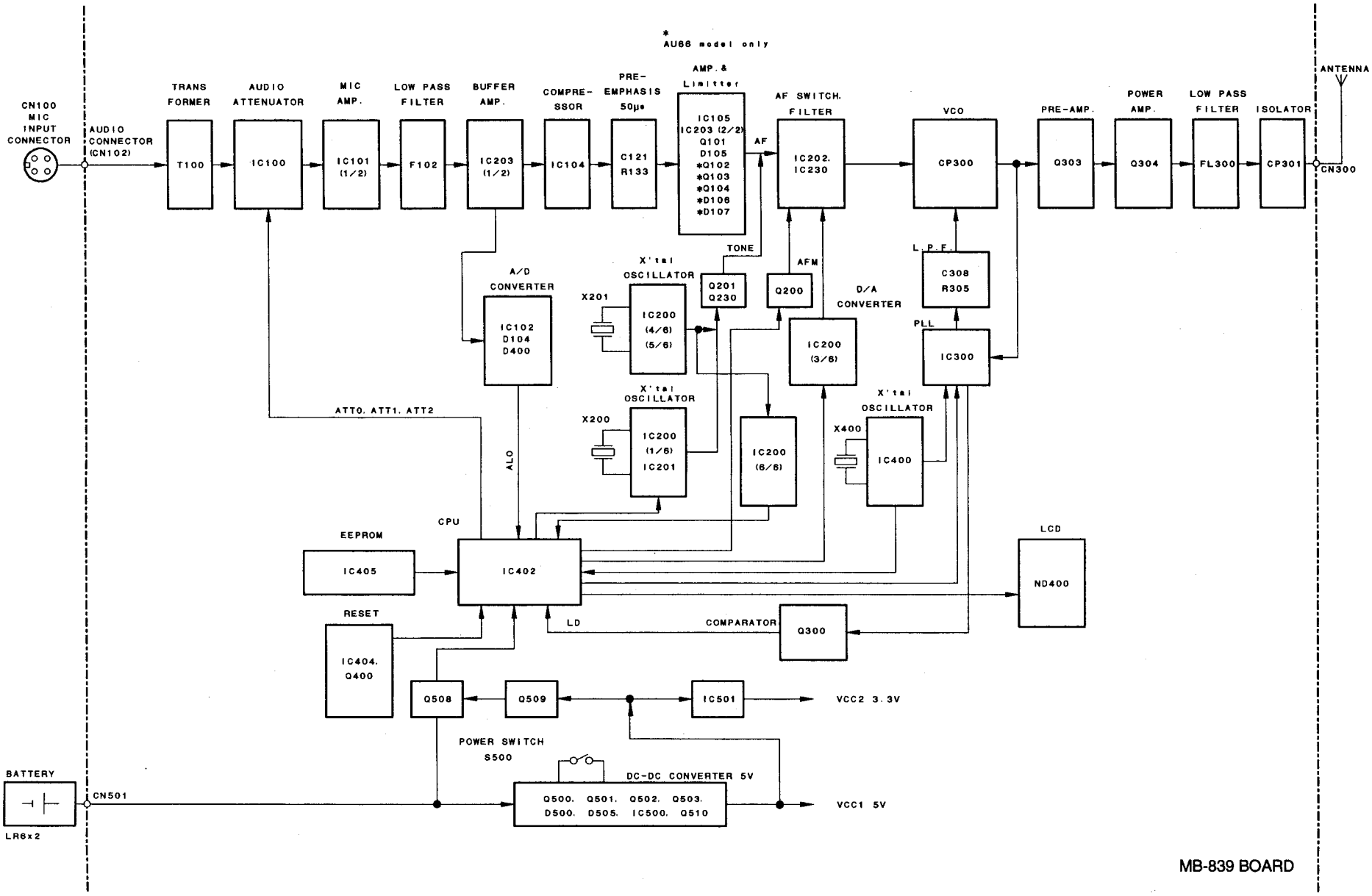
The oscillation circuit utilizes the PLL frequency synthesizer method. The VCO (CP300) acts as an oscillator and modulator for the carrier frequency through voltage control.
The carrier frequency is controlled by the serial data (PLL data) sent from the CPU to the PLL IC (IC300).
The signal is amplified by the RF amplifier circuit (Q303,304) is output from the antenna via the low-pass filter(FL300) and isolator (CP301).
Further the voltage comparator (Q300) detects the lock condition of the PLL by inputting the output signal (LD signal) from the phase comparator in the PLL IC, and sends the signal to CPU.
The voltage control circuit (Q301, 302) performs ON/OFF control of the power voltage for the RF circuit. This control signal is the RFM signal from the CPU. (When the RFM signal switches "L", the power is provided to the RF circuit.)

CPU and the peripheral circuit block

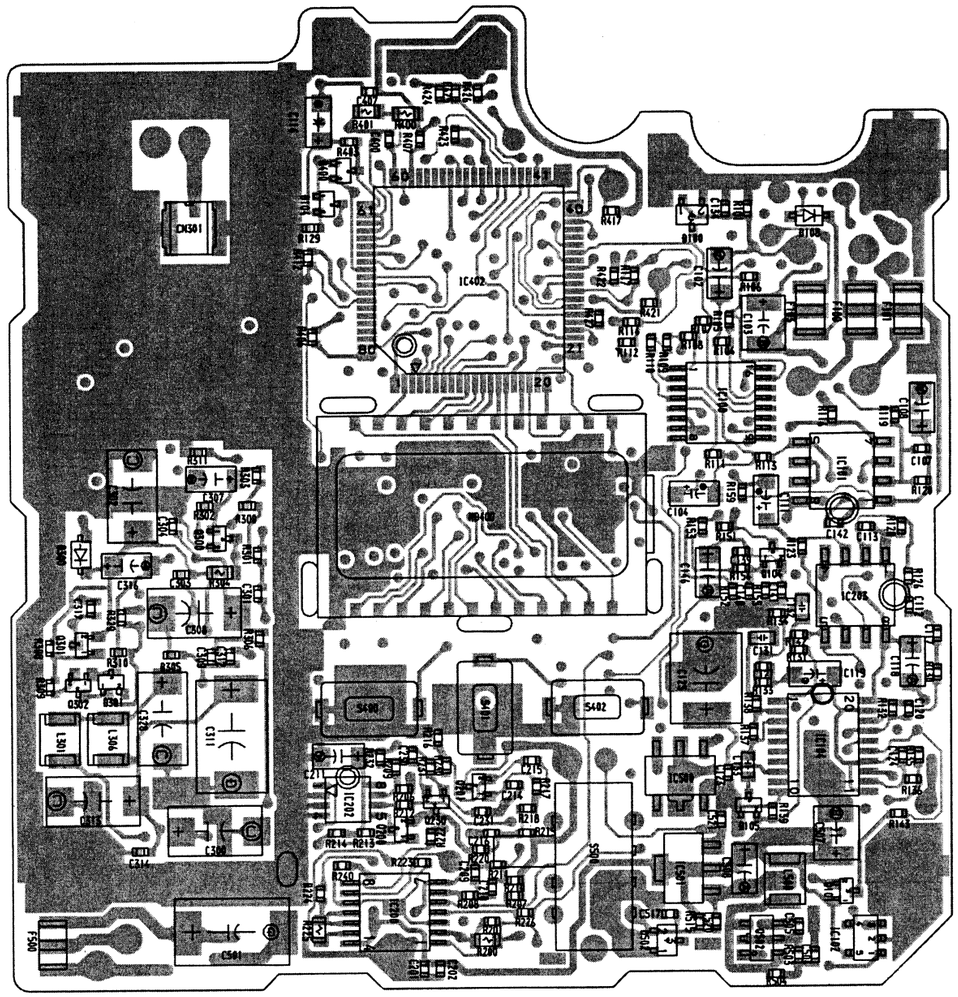
The CPU (IC402) is a 4-bit microprocessor, and the clock is used a 4 MHz (X400, IC400).
The CPU sends out the PLL data, and controls the AF mute, RF mute, ATT, LCD, and so on.
The voltage detector circuit (IC404) detects the power supply voltage (+2.0 V) and uses it to reset the CPU.
Also, the reference voltage circuit (R402, C401) generates a 5.0 V which is used by the CPU as the reference for detecting battery voltage and AF indicator voltages.

Power supply circuit block

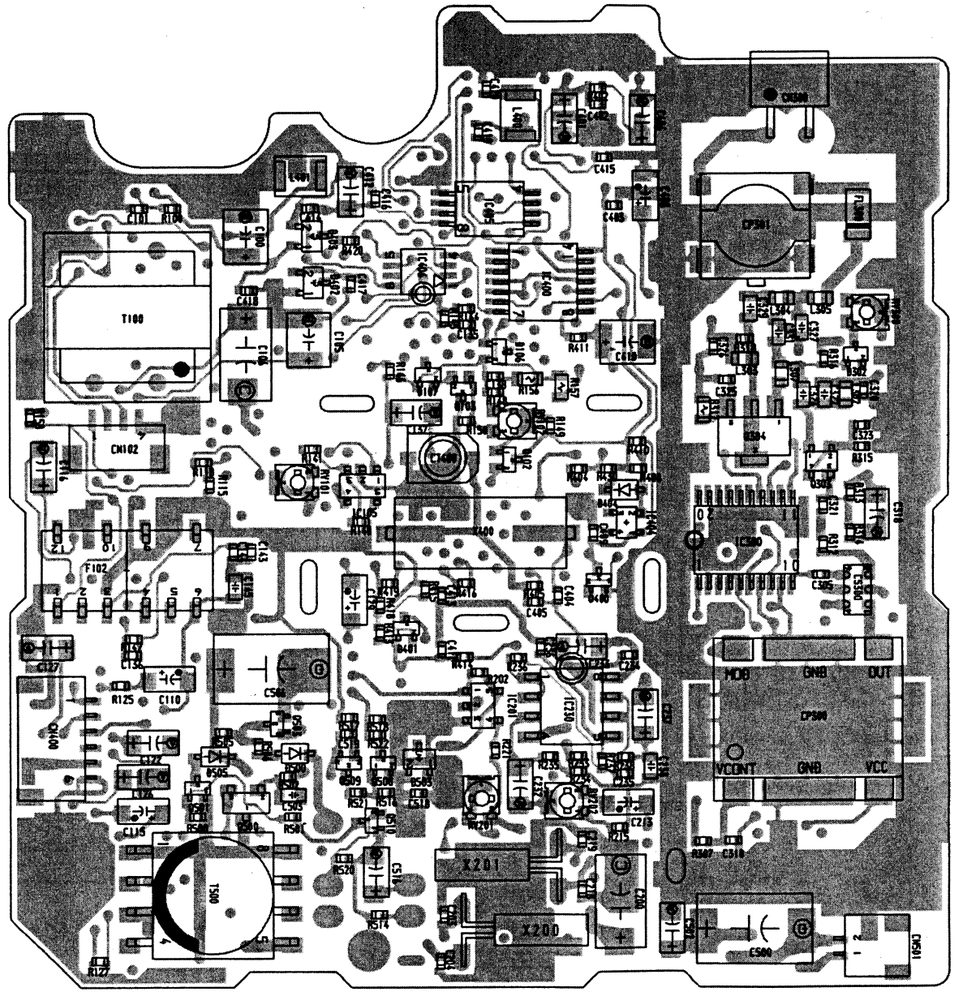
The DC-DC converter circuit (IC500, Q500, Q501, Q502, D500, D505) extracts the 5 V (Vcc1) from the 3.0 V battery voltage and supplies to audio section.
The DC-DC converter circuit (IC501) extracts the 3.3 V (Vcc2) from the 5 V (Vcc1).
The power switch circuit performs ON/OFF control of voltage input to the DC-DC converter. This is controlled by power switch circuit (S500, Q503, Q510) and CPU (IC402).


* AU66 model only
CN100 MIC INPUT CONNECTOR
AUDIO CONNECTOR (CN102)
TRANS FORMER
T100
AUDIO ATTENUATOR
IC100
MIC AMP.
IC101 (1/2)
LOW PASS FILTER
F102
BUFFER AMP.
IC203 (1/2)
COMPRE-SSOR
IC104
PRE-EMPHASIS 50μs
C121 R133
AMP. & Limitter
IC105 IC203 (2/2) Q101 D105 *Q102 *Q103 *Q104 *D106 *D107
AF
AF SWITCH. FILTER
IC202. IC230
VCO
CP300
PRE-AMP.
Q303
POWER AMP.
Q304
LOW PASS FILTER
FL300
ISOLATOR
CP301
ANTENNA
CN300
TONE
AFM
L.P.F.
C308 R305
A/D CONVERTER
IC102 D104 D400
X'tal OSCILLATOR
X201
IC200 (4/6) (5/6)
Q201 Q230
Q200
D/A CONVERTER
IC200 (3/6)
PLL
IC300
ATT0. ATT1. ATT2
ALO
X'tal OSCILLATOR
X200
IC200 (1/6) IC201
IC200 (6/6)
X'tal OSCILLATOR
X400
IC400
CPU
EEPROM
IC405
IC402
LCD
ND400
RESET
IC404. Q400
LD
COMPARATOR
Q300
Q508
Q509
IC501
VCC2 3.3V
POWER SWITCH S500
DC-DC CONVERTER 5V
Q500. Q501. Q502. Q503. D500. D505. IC500. Q510
VCC1 5V
BATTERY
LR6x2
CN501
MB-839 BOARD

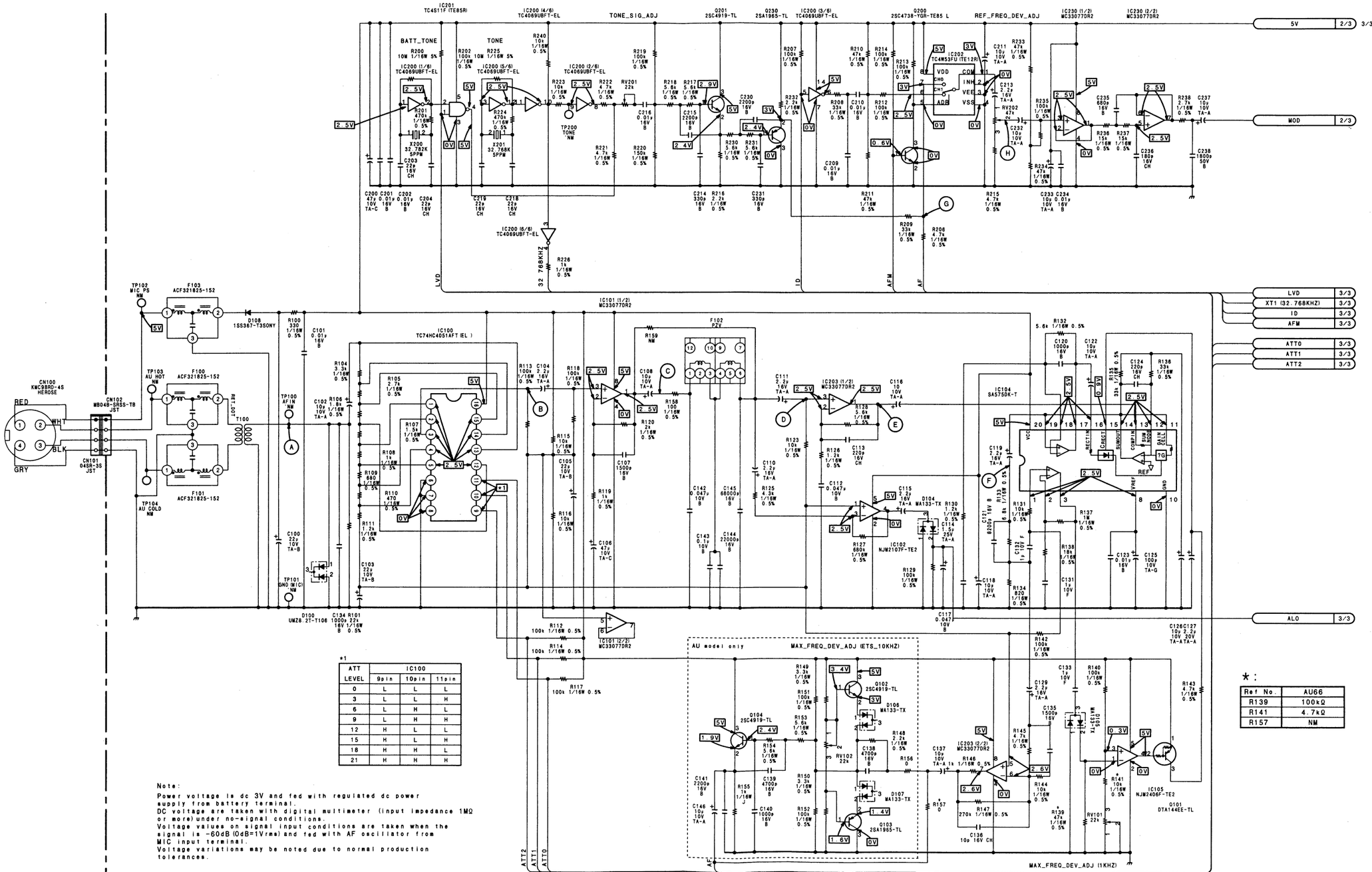
Section 7
Board Layout and Schematic Diagrams



MB-839 -A SIDE-
1-673-568-13



MB-839 -B SIDE-
1-673-568-13



*1

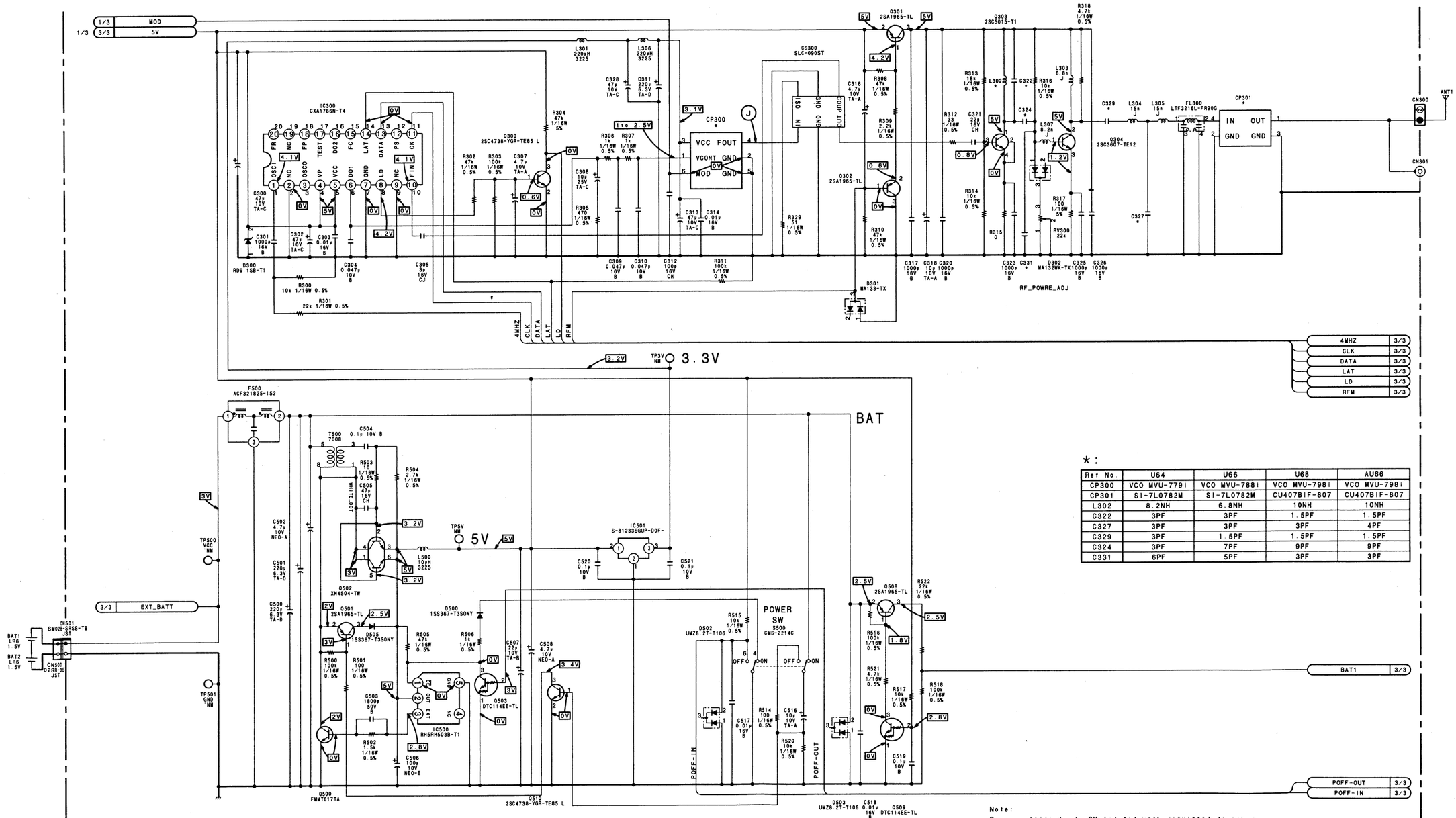
ATT LEVEL	IC100 9pin	10pin	11pin
0	L	L	L
3	L	L	H
6	L	H	L
9	L	H	H
12	H	L	L
15	H	L	H
18	H	H	L
21	H	H	H

Note:
Power voltage is dc 3V and fed with regulated dc power supply from battery terminal.
DC voltage are taken with digital multimeter (input impedance 1MΩ or more) under no-signal conditions.
Voltage values on signal input conditions are taken when the signal is -60dB (0dB=1Vrms) and fed with AF oscillator from MIC input terminal.
Voltage variations may be noted due to normal production tolerances.

*:

Ref No.	AU66
R139	100kΩ
R141	4.7kΩ
R157	NM

MB-839 (1/3)



4MHZ	3/3
CLK	3/3
DATA	3/3
LAT	3/3
LD	3/3
RFM	3/3

BAT1	3/3

POFF-OUT	3/3
POFF-IN	3/3

*:

Ref No.	U64	U66	U68	AU66
CP300	VCO MVU-779i	VCO MVU-788i	VCO MVU-798i	VCO MVU-798i
CP301	SI-7L0782M	SI-7L0782M	CU407BIF-807	CU407BIF-807
L302	8.2NH	6.8NH	10NH	10NH
C322	3PF	3PF	1.5PF	1.5PF
C327	3PF	3PF	3PF	4PF
C329	3PF	1.5PF	1.5PF	1.5PF
C324	3PF	7PF	9PF	9PF
C331	6PF	5PF	3PF	3PF

Note:
Power voltage is dc 3V and fed with regulated dc power supply from battery terminal.
DC voltage are taken with digital multimeter (input impedance 1MΩ or more) under no-signal conditions.
Voltage values on signal input conditions are taken when the signal is -60dB (0dB=1Vrms) and fed with AF oscillator from MIC input terminal.
Voltage variations may be noted due to normal production tolerances.

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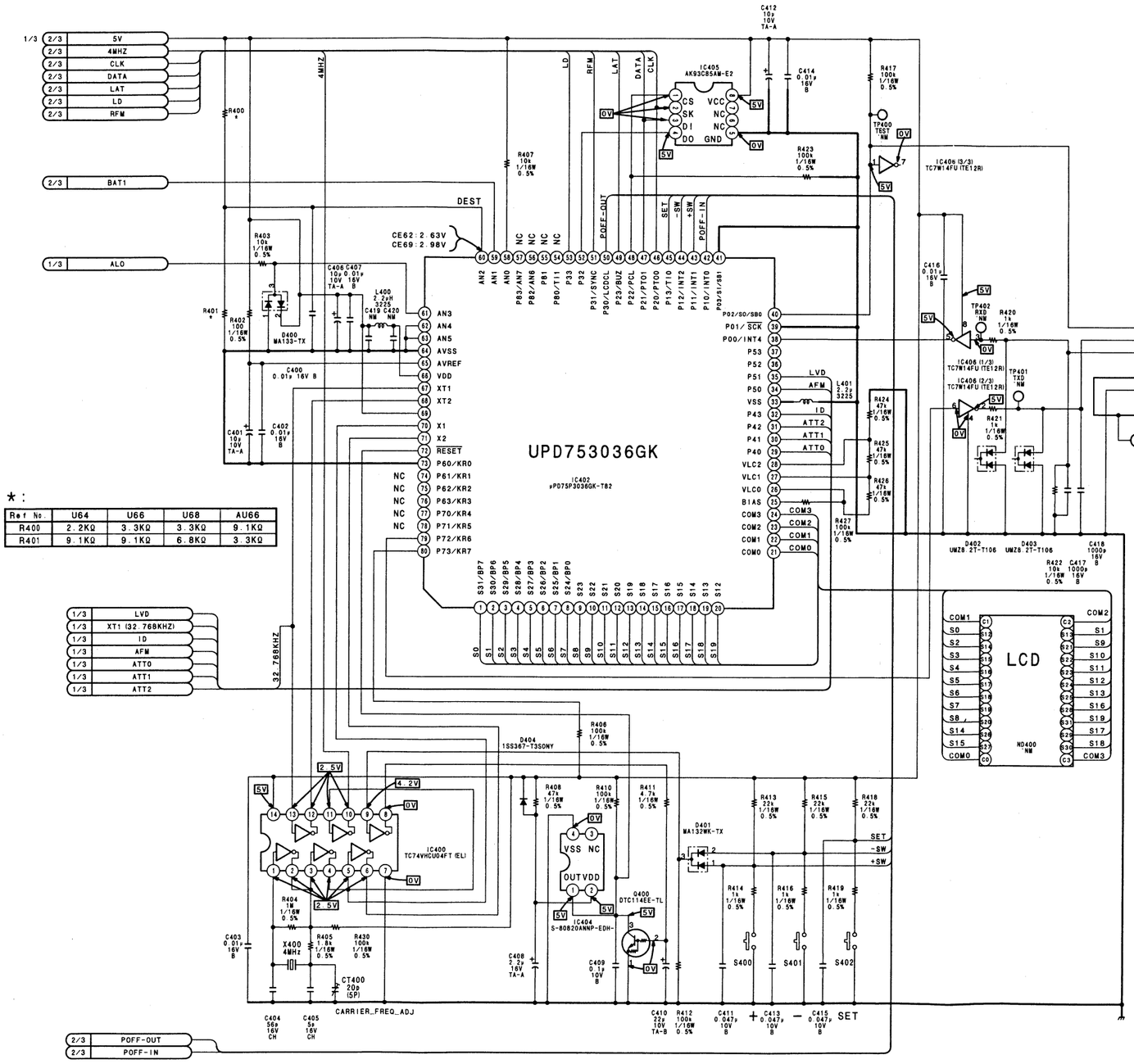
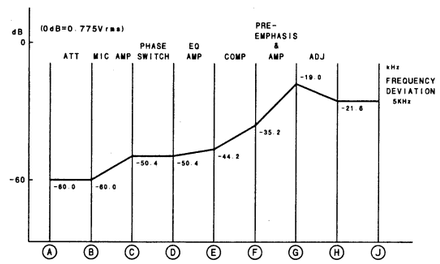


★:

Ref No.	U64	U66	U68	AU66
R400	2.2KΩ	3.3KΩ	3.3KΩ	9.1KΩ
R401	9.1KΩ	9.1KΩ	6.8KΩ	3.3KΩ

- Level diagram



Note:
- Power voltage is dc 3.0Vdc and fed with regulated dc power supply from battery terminal.
- Reference input signal is -60dB (0dB=1Vrms) and fed with AF oscillater from MIC connector.
- For measuring points (Ⓐto Ⓙ), see schematic diagram.
- Level values are referential values measured with AF level meter.

Note:
Power voltage is dc 3V and fed with regulated dc power supply from battery terminal.
DC voltage are taken with digital multimeter (input impedance 1MΩ or more)under no-signal conditions.
Voltage values on signal input conditions are taken when the signal is -60dB (0dB=1Vrms) and fed with AF oscillator from MIC input terminal.
Voltage variations may be noted due to normal production tolerances.

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